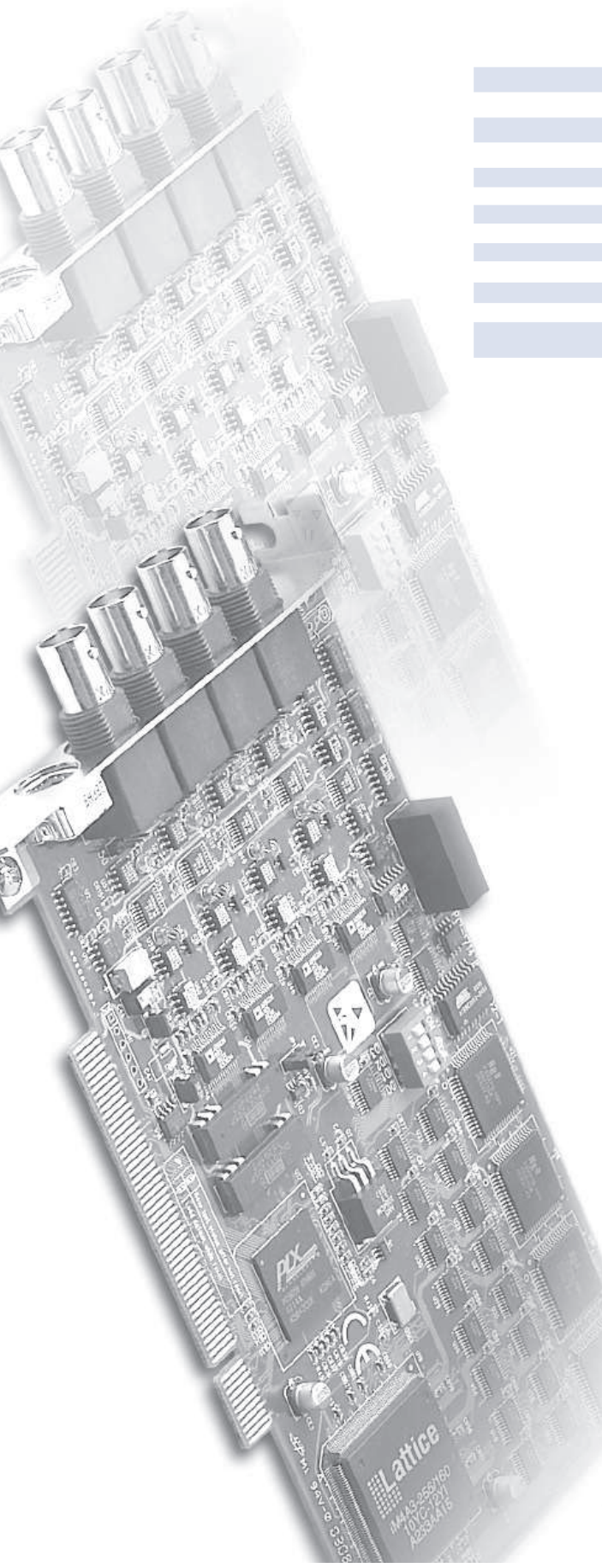
19 Data Acquisition Boards



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To view all of Advantech's Data Acquisition Boards, please visit www.advantech.com/products.

Data Acquisition and Control Tutorial & Software

PC-based Data Acquisition (DAQ) System Overview

Because industrial PC I/O interface products have become increasingly reliable, accurate, and affordable in the last few years, PC-based data acquisition and control systems are nowadays widely used in industrial and laboratory applications such as monitoring, control, data acquisition and automated testing.

It requires know-how of electrical and computer engineering to select and build a data acquisition (DAQ) and control system that actually does what you want. This tutorial gives a brief introduction to what data acquisition and control systems do and how to configure them. Here, we cover:

- Transducers and Actuators
- Signal Conditioning
- Data Acquisition and Control Hardware
- Getting Started

Transducers and Actuators

A transducer converts temperature, pressure, level, length, position, etc. into voltage, current, frequency, pulses or other signals.

Thermocouples, thermistors and resistance temperature detectors (RTDs) are common transducers for temperature measurements. Other types of transducers include flow sensors, pressure sensors, strain gauges, load cells and LVDTs, which measure flow rate, pressure variances, force or displacement.

An actuator is a device that activates process control equipment by using pneumatic, hydraulic or electrical power. For example, a valve actuator can open and close a valve to control fluid rates.

Signal Conditioning

Signal conditioning circuits improve the quality of signals generated by transducers before they are converted into digital signals by the PC's data-acquisition hardware. Examples of signal conditioning are signal scaling, amplification, linearization, cold-junction compensation, filtering, attenuation, excitation, common-mode rejection, and so on.

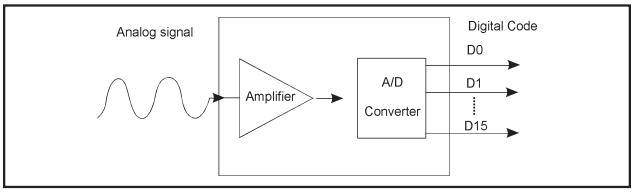
One of the most common signal conditioning functions is amplification. For maximum resolution, the voltage range of the input signals should be approximately equal to the maximum input range of the A/D converter. Amplification expands the range of the transducer signals so that they match the input range of the A/D converter. For example, a x10 amplifier maps transducer signals that range from 0 to 1 V into the range 0 to 10 V before they go into the A/D converter.

Data Acquisition & Control Hardware

Data acquisition and control hardware generally performs one or more of the following functions: analog input, analog output, digital input, digital output and counter/timer functions. This section will discuss each function and list some considerations that are important when you select a data acquisition and control system.

Analog Inputs (A/D)

Analog to digital (A/D) conversion changes analog voltage or current levels into digital information. The conversion is necessary to enable a computer to process or store the signals.

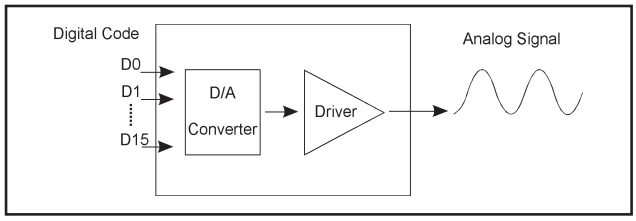


The most significant criteria when selecting A/D hardware are:

1. Number of input channels
2. Single-ended or differential input signals
3. Sampling rate (in samples per second)
4. Resolution (usually measured in bits of resolution)
5. Input range (specified in full-scale volts)
6. Noise and nonlinearity

Analog Outputs (D/A)

The opposite of analog to digital conversion is digital to analog (D/A) conversion. This operation converts digital information into analog voltage or current. D/A devices allow a computer to control real-world events.



Analog output signals may directly control process equipment. The process can give feedback in the form of analog input signals. This is referred to as a closed loop control system with PID control. Analog outputs can also be used to generate waveforms. In this case, the device behaves as a function generator.

Digital Inputs and Outputs

Digital input/output functions are useful in applications such as contact closure and switch status monitoring, industrial On/Off control and digital communications.

Counter/Timer

A counter/timer can be used for event counting, flowmeter monitoring, frequency counting, pulse width measurement, time period measurement, and so on.

Getting Started

Advantech: The Source For What You Need

Advantech manufactures data acquisition hardware and software for measurement, monitoring and applications control. The following guide is provided to help you choose components for your data acquisition system.

Step 1: Know Your Fundamental Goal

Decide whether your DAQ system will be used primarily for measurement, monitoring, control, or analysis. Know the data requirements of your process, and know the number of data collection points in your system. Know the required data collection speed, the sampling rate, the type of measurement, the voltage or current being produced, the desired accuracy and the output resolution at each data collection point. Finally, know the timing of events in your system, and any special environmental conditions that exist.

Step 2: Hardware Selection

Select the hardware required to achieve your fundamental goal. Advantech provides plug-in boards for Analog-to-Digital, Digital-to-Analog, Digital I/O needs. Both ISA and PCI bus products are available. Your hardware selection should be based on five major criteria:

1. Number and types of channels
2. Differential or single-ended inputs
3. Resolution
4. Speed
5. Software compatibility with hardware

Step 3: Accessory Selection

Most applications require additional accessories which are available as separate items. These include:

1. Expansion peripherals to add channels to your system
2. Cables, signal conditioners and external boxes such as screw terminals or BNC accessories

Step 4: Software Selection

More than any other single factor, software will determine your system start-up time, as well as its effectiveness, suitability for your application, and ease of modification.

Three major criteria should determine the choice of software:

1. Operating system used
2. User programming expertise
3. Software compatibility with hardware

DAQNavi Introduction

What is DAQNavi?

DAQNavi is a Advantech next-generation driver package, for programmers to develop their application programs using Advantech DAQ boards or devices. This integrated driver package includes device drivers, SDK, tutorial and utility. With the user-friendly design, even the beginner can quickly get familiar with how to utilize DAQ hardware and write programs through the intuitive "Advantech Navigator" utility environment. Many example codes for different development environment dramatically decrease users' programming time and effort.

You can go to www.advantech.com/DAQNavi for more information about Advantech DAQNavi.

Multiple Operating System Support

DAQNavi supports many popular operating systems (OS) used in automation applications. For different OSs, API functions will be the same, so users can simply install the driver without modifying their program again when migrating between two different OSs.

DAQNavi supports latest Windows 8/7/Vista/XP and Windows CE (both 32-bit and 64-bit).

Besides Windows operating system, Linux is famous for its openness and flexibility. DAQNavi software package also support Linux OS including Ubuntu, Fedora, Debian, Susi distributions. For other distributions, please contact the local Advantech branch or dealer in your area.

Note: DAQNavi only supports Windows 8 desktop version. Windows RT version is not supported.

LabVIEW and Matlab Support

LabVIEW is popular graphical development environment used for measurement and automation. For LabVIEW user, DAQNavi offers two options for programming: Express VI and Polymorphic VIs. Express VI helps user quickly complete his programming without extra wiring. When user drags the Express VI on LabVIEW Block Diagram, a pop-up intuitive wizard window will appear and user can perform configurations. After that, the programming is done. So it is similar to the .NET Component DAQ Wizard used in Microsoft Visual Studio environment, making programming more easily. As for the Polymorphic VI, user can use several VIs and wiring to build more complex program. Except LabVIEW, DAQNavi also support Matlab programming.

.NET Support

DAQNavi offers a series of **.NET Component** object, that you can benefit from platform-unified feature by latest .NET technology. User can simply drag and drop the .NET Components within .NET programming environment, such as Microsoft Visual C# and VB .NET. An intuitive window (called "DAQNavi Wizard") will pop-up, and user can perform all configurations by sequence. It is so-called "Configure & Run" programming. Programmers also can choose writing code manually with the .NET Component, to have a more flexible object calling. With Advantech CSCL technology, engineers can do the similar programming in an native environment such as Visual C++.

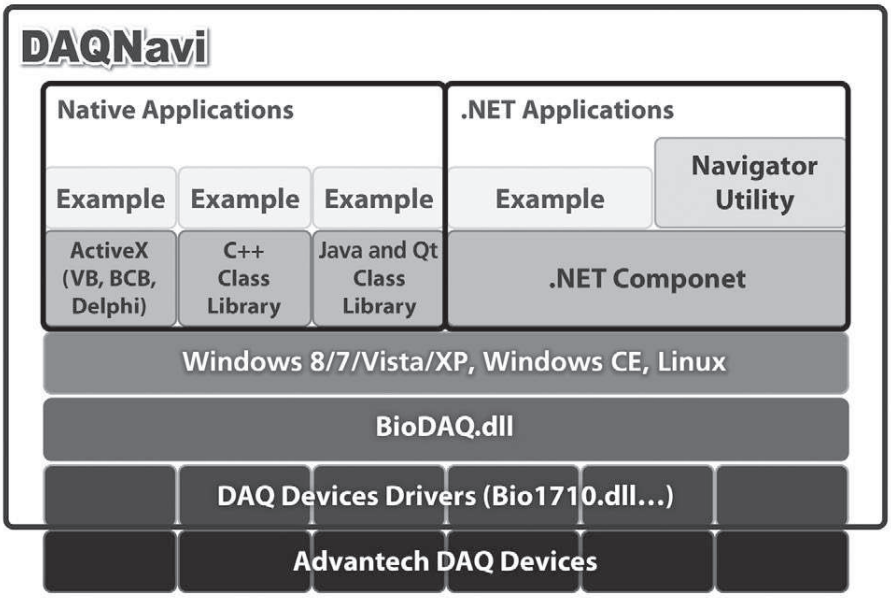
C++, Delphi, VB, BCB, Java and Qt Support

DAQNavi offers C++ Class Library (for VC++ and Borland C++ Builder) and ActiveX (for Visual Basic, Delphi, and BCB) for Native programming environment with the same calling interface as .NET Class Library. With DAQNavi Java class library and Qt class library, users can develop Java and Qt programs to migrate between different operating systems (including Windows and Linux).

Support Modules

DAQNavi supports all PCI Express, PCI, PC/104, and PCI-104 cards, as well as all USB DAQ devices.

DAQNavi Driver Package Architecture



Note: When you visit Advantech DAQNavi download website, you can find two software: (1) DAQNavi SDK (2) individual DAQNavi driver for specific hardware. You need to install these two software on your computer to utilize the hardware.

Powerful Intuitive Utility: Advantech Navigator

Devices

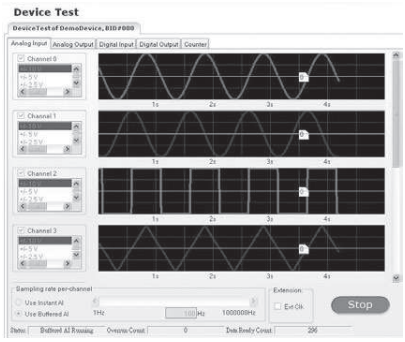
You can see all your installed Advantech DAQ devices here, including the simulated DAQ device called “DemoDevice”. In other words, you don’t need any hardware installed on your computer to test all operations within DAQNavi. For each device, there are four items you can select.

1. Device Setting

You can perform all hardware configurations for the selected device.

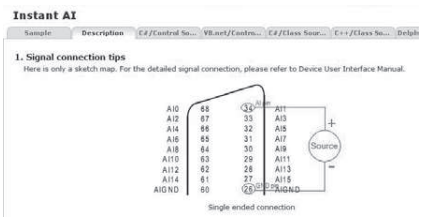
2. Device Test

You can test all hardware functionality here, without any programming.



3. Scenarios

Advantech defines commonly-used measurement and automation applications, named "scenarios" for users to refer. For each scenario, one example program is embedded within Advantech Navigator that you can execute it directly. Corresponding source code for each scenario is provided, written by different language (C#, VB .NET, C++, Delphi , Qt, VB6, and Java). Besides, wiring diagram for each scenario is available here.


Instant AI
1. Signal connection tips
Here is only a sketch map. For the detailed signal connection, please refer to Device User Interface Manual.
Source
Single ended connection

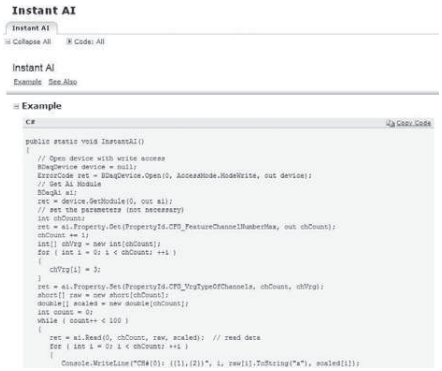
4. Reference

You can find the detailed user manual for the selected device.

SDKs

1. DAQ User Interface Manual

To shorten the development time, Advantech offer a lot of tutorial and reference documentation.There are two programming ways you can refer: (1) Class Library (2) Device Control. You can find instructions for programming. It not only teaches you how to create one application project, but also how to write the program with a programming chart and example code.



2.Tutorial Video

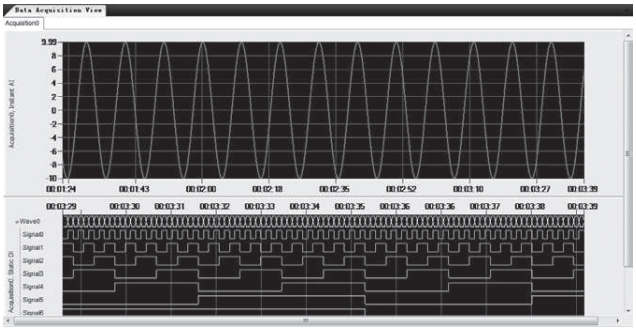
If you don't know how to start creating a project, Advantech offers a tutorial video for your programming reference.

Scenarios: Commonly-used for Measurement and Automation Applications

Category	Scenario	Description
Analog Input	Instant AI	Read single AI value once
	Asynchronous One Buffered AI	Read a buffer of AI values once (Don't need to wait the acquisition is done to run other program)
	Synchronous One Buffered AI	Read a buffer of AI values once (Need to wait the acquisition is done to run other program)
	Streaming AI	Continuously read a buffer of AI values
Analog Output	Static AO	Change AO values once
	Asynchronous One Waveform AO	Change AO value based on a pre-defined waveform once (Don't need to wait the generation is done to run other program)
	Synchronous One Waveform AO	Change AO value based on a pre-defined waveform once (Need to wait the generation is done to run other program)
	Streaming AO	Continuously change AO value based on a pre-defined waveform
Digital Input	Static DI	Read the selected DI port value once
	DI Interrupt	When DI bit meets a pre-defined edge change (rising or falling), an interupt is generated
	DI Pattern Match Interrupt	When selected DI port meets pre-defined pattern, an interupt is generated
	DI Status Change Interrupt	When the status of certain selected channel of DI port changes, an interupt is generated
Digital Output	Static DO	Change DO values once
Timer/ Counter	Delayed Pulse Generation	When a trigger from coutner gate is met, a pulse is generated after a specific period
	Pulse Output with Timer Interrupt	Continuously generate a periodic pulse train (using counter internal clock), and an event will be sent out at the same time.
	Event Counter	Continously count the pulse number of signal from counter input
	Frequency Measurement	Meaure frequency of singal from counter input
	Pulse Width Measurement	Meaure pulse width of signal from counter input
	PWM Output	Generate PWM (Pulse Width Modulation) signal

DAQNavi Data Logger

Configurable Data Logging Software



Features

- Data logging, display and recording without programming
- Instant AI, buffered AI and static DI data logging
- Intuitive hardware channel parameters configuration wizard
- Supports simulated device operation
- Save configurations into a project file for future re-use
- Real-time display with zoom and pan operation
- Supports data recording to store as file to local disk
- Recorded data playback to view historical data
- Supports both analog graph and digital graph display

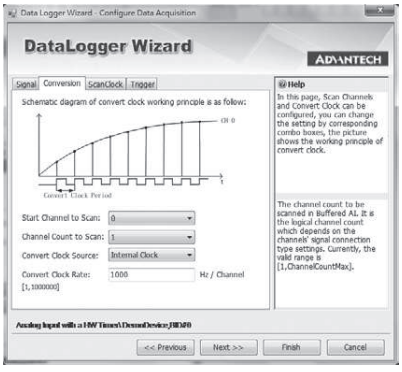
Introduction

Advantech DAQNavi Data Logger is ready-to-use application software that engineers can leverage its easy-to-use interface to perform data logging, display and recording. Without spending any time on programming, engineers can benefit from flexibility to acquire and store data from various Advantech data acquisition devices for their data logging tasks.

Features Details

Data Acquisition Devices Configuration

Before data logging measurement, engineers can do all necessary analog and digital input channels configuration using built-in DAQNavi wizard. Step-by-step instructions by intuitive window can help engineer easily complete related settings. Except real data acquisition devices, DAQNavi Data Logger also offer simulated device that engineers can do all operation without any hardware installed on computer.



Configuration Management by Project Files

Engineer can create and edit a project to include one or several data logging tasks.

Within one project, data can be acquired and displayed from one or multiple data acquisition devices. Current input channels configurations and logging settings can be saved as a specific project file. Afterwards, engineer can open previous project file to load all configurations and start data logging tasks immediately.

Real-time Data Logging, Display and Recording

After data acquisition configuration is done, engineers can immediately start data acquisition and display the logging data on a real-time graph. The graph can be zoom in, zoom out or pan dynamically during data logging. Engineers can decide if they want to record the data (save data into a pre-defined file) during data logging.

Historical Data Playback

Previous recorded data can be loaded back to DANNavi Data Logger software and viewed by Playback function. Related zoom in, zoom out and pan operation is also available for historical data display.

Specifications

Supported Hardware

- PCI Express multifunction, analog input and digital input cards
- PCI multifunction, analog input and digital input cards
- USB multifunction, analog input and digital input modules
- PC/104 and PCI-104 multifunction, analog input and digital input cards

Analog I/O & Multifunction Card Selection Guide

Category			Multifunction						
Bus			PCI						
Model			PCI-1710U/UL	PCI-1710HGU	PCI-1711U/UL	PCI-1712/L	PCI-1716/L	PCI-1706U/UL	PCI-1718HDU
Analog Input	General Spec.	Resolution	12 bits	12 bits	12 bits	12 bits	16 bits	16 bits	12 bits
		Channels	16 SE/8 Diff.	16 SE/8 Diff.	16 SE	16 SE/8 Diff.	16 SE/8 Diff.	8 Diff.	16 SE/8 Diff.
		Onboard FIFO	4,096 samples	4,096 samples	1,024 samples	1,024 samples	1,024 samples	8,192 samples	1,024 samples
		Sampling Rate	100 kS/s	100 kS/s	100 kS/s	1 MS/s	250 kS/s	250 kS/s	100 kS/s
	Input Ranges	Unipolar Inputs (V)	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 1, 0 ~ 0.1, 0 ~ 0.01	-	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	-	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25
		Bipolar Inputs (V)	±10, 5, 2.5, 1.25, 0.625	±10, 5, 1, 0.5, 0.1, 0.05, 0.01, 0.005	±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25	±10, 5, 2.5, 1.25, 0.625
		Configurable Per-Channel	✓	✓	✓	✓	✓	✓	✓
	Trigger Modes	Pacer/Software/ External Pulse	✓	✓	✓	✓	✓	✓	✓
		Analog Slope	-	-	-	✓	-	✓	-
		Advanced Trigger	-	-	-	✓	-	✓	-
	Data Transfer Modes	Software	✓	✓	✓	✓	✓	✓	✓
		DMA	-	-	-	Bus-mastering	Bus-mastering	✓	-
Analog Output	Resolution		12 bits	12 bits	12 bits	12 bits	16 bits	12 bits	12 bits
	Channels		2 (PCI-1710U only)	2	2 (PCI-1711U only)	2 (PCI-1712 only)	2 (PCI-1716 only)	2 (PCI-1706U only)	1
	Onboard FIFO		-	-	-	32,768 samples	-	-	-
	Output Range (V)		0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10, ±5, ±10	0 ~ 5, 0 ~ 10, ±5, ±10	0 ~ 5, 0 ~ 10, ±5, ±10, 0 ~ 20 mA, 0 ~ 24 mA, 4 ~ 20 mA	0 ~ 5, 0 ~ 10
	Output Rate		Static update	Static update	Static update	1 MS/s	Static update	Static update	Static update
	DMA Transfer		-	-	-	✓	-	-	-
Digital I/O	Input Channels		16	16	16	16 (shared)	16	16 (shared)	16
	Output Channels		16	16	16		16		16
Timer/ Counter	Channels		1	1	1	3	1	2	1
	Resolution		16 bits	16 bits	16 bits	16 bits	16 bits	32 bits	16 bits
	Max. Input Frequency		10 MHz	10 MHz	10 MHz	10 MHz	10 MHz	10 MHz	10 MHz
Isolation Voltage			-	-	-	-	-	-	-
Auto Calibration			-	-	-	✓	✓	✓	-
BoardID Switch			✓	✓	✓	-	✓	✓	✓
Dimensions (mm)			175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100
Connector			68-pin SCSI	68-pin SCSI	68-pin SCSI	68-pin SCSI	68-pin SCSI	68-pin SCSI	DB37
Legacy Driver	Windows XP/2000		✓	✓	✓	✓	✓	✓	✓
	WinCE		✓	-	-	-	-	-	-
	Linux		✓	✓	✓	✓	✓	✓	✓
DAQNavi Driver	Windows 8/7/Vista/XP/2000		✓	✓	✓	✓	✓	✓	✓
	WinCE		✓	-	-	-	-	-	-
	Linux		-	-	✓	-	-	-	-
LabVIEW Driver			✓	✓	✓	✓	✓	✓	✓
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* All channels should be set to the same range.
** SS: Single DMA channel, Single A/D channel scan; SM: Single DMA channel, Multiple A/D channel scan

Category			Multifunction						
Bus			PCI		ISA				
Model			PCI-1741U	PCI-1742U	PCL-711B	PCL-812PG	PCL-818L	PCL-818HD	PCL-818HG
Analog Input	General Spec.	Resolution	16 bits	16 bits	12 bits	12 bits	12 bits	12 bits	12 bits
		Channels	16 SE/8 Diff.	16 SE/8 Diff.	8 SE	16 SE	16 SE/8 Diff	16 SE/8 Diff	16 SE/8 Diff
		Onboard FIFO	1,024 samples	1,024 samples	-	-	-	1,024 samples	1,024 samples
		Sampling Rate	200 kS/s	1 MS/s	40 kS/s	30 kS/s	40 kS/s	100 kS/s	100 kS/s
	Input Ranges	Unipolar Inputs (V)	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25*	0 ~ 10, 0 ~ 5 0 ~ 2.5, 0 ~ 1.25	-	-	-	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 1, 0 ~ 0.1, 0 ~ 0.01
		Bipolar Inputs (V)	±10, 5, 2.5, 1.25, 0.625*	±10, 5, 2.5, 1.25,0.625	±5, 2.5, 1.25, 0.625, 0.3125	±10, 5, 2.5, 1.25, 0.625, 0.3125	±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25, 0.625	±10, 5, 1, 0.5, 0.1, 0.05, 0.01, 0.005
		Configurable Per-Channel	-	✓	✓	✓	✓	✓	✓
	Trigger Modes	Pacer/Software/ External Pulse	✓	✓	✓	✓	✓	✓	✓
		Analog Slope	-	-	-	-	-	-	-
		Advanced Trigger	-	-	-	-	-	-	-
	Data Transfer Modes	Software	✓	✓	✓	✓	✓	✓	✓
		DMA	-	Bus-mastering	-	SS**	SM**	SM**	SM**
Analog Output	Resolution		16 bits	16 bits	12 bits	12 bits	12 bits	12 bits	12 bits
	Channels		1	2	1	2	1	1	1
	Onboard FIFO		-	-	-	-	-	-	-
	Output Range (V)		±5, ±10	0 ~ 5, 0 ~ 10, ±5, ±10	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10, ±10	0 ~ 5, 0 ~ 10, ±10
	Output Rate		Static update	Static update	Static update	Static update	Static update	Static update	Static update
	DMA Transfer		-	-	-	-	-	-	-
Digital I/O	Input Channels		16	16	16	16	16	16	16
	Output Channels		16	16	16	16	16	16	16
Timer/ Counter	Channels		1	1	-	1	1	1	1
	Resolution		16 bits	16 bits	-	16 bits	16 bits	16 bits	16 bits
	Max. Input Frequency		10 MHz	10 MHz	-	2 MHz	10 MHz	10 MHz	10 MHz
Isolation Voltage			-	-	-	-	-	-	-
Auto Calibration			✓	✓	-	-	-	-	-
BoardID Switch			✓	✓	-	-	-	-	-
Dimensions (mm)			175 x 100	175 x 100	175 x 100	185 x 100	155 x 100	185 x 100	185 x 100
Connector			68-pin SCSI	68-pin SCSI	3 x 20-pin	5 x 20-pin	DB37	DB37	DB37
Legacy Driver	Windows XP/2000		✓	✓	✓	✓	✓	✓	✓
	WinCE		-	-	-	-	-	-	-
	Linux		✓	✓	-	-	-	-	-
DAQNavi Driver	Windows 8/7/Vista/XP/2000		✓	✓	-	-	✓	✓	✓
	WinCE		-	-	-	-	-	-	-
	Linux		✓	-	-	-	-	-	-
LabVIEW Driver			✓	✓	✓	✓	✓	✓	✓
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* All channels should be set to the same range.
** SS: Single DMA channel, Single A/D channel scan; SM: Single DMA channel, Multiple A/D channel scan

Analog I/O & Multifunction Card Selection Guide

Category			Multifunction						
Bus			PC/104			PCI-104	PCIE		
Model			PCM-3718H	PCM-3718HG	PCM-3718HO	PCM-3810I	PCIE-1810	PCIE-1816	PCIE-1816H
Analog Input	General Spec.	Resolution	12 bits	12 bits	12 bits	12 bits	12 bits	16 bits	16 bits
		Channels	16 SE/8 Diff.	16 SE/8 Diff.	16 SE/8 Diff.	16 SE/8 Diff.	16 SE/8 Duff.	16 SE/8 Duff.	16 SE/8 Duff.
		Onboard FIFO	-	-	1,024 samples	4,096 samples	4,096 samples	4,096 samples	4,096 samples
		Sampling Rate	100 kS/s	100 kS/s	100 kS/s*	250 kS/s	500 kS/s	500 kS/s	1 MS/s
	Input Ranges	Unipolar Inputs (V)	0 ~ 10, 0 ~ 5 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 1 0 ~ 0.1, 0 ~ 0.01	0 ~ 10, 0 ~ 5 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25
		Bipolar Inputs (V)	±10, 5, 2.5, 1.25, 0.625	±10, 5, 1, 0.5, 0.1, 0.05, 0.01, 0.005	±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25, 0.625	±10, ±5, 2.5, 1.25, 0.625	±10, ±5, 2.5, 1.25, 0.625	±10, ±5, 2.5, 1.25, 0.625
		Configurable Per-Channel	✓	✓	✓	✓	✓	✓	✓
	Trigger Modes	Pacer/ Software/ External Pulse	✓	✓	✓	✓	✓	✓	✓
		Analog Slope	-	-	-	-	✓	✓	✓
		Advanced Trigger	-	-	-	✓	Start/ Stop/ Delay to Start/ Delay to Stop	Start/ Stop/ Delay to Start/ Delay to Stop	Start/ Stop/ Delay to Start/ Delay to Stop
	Data Transfer Modes	Software	✓	✓	✓	✓	✓	✓	✓
		DMA	SS**	SS**	SS**	-	Bus-mastering	Bus-mastering	Bus-mastering
Analog Output	Resolution		-	-	12 bits	12 bits	12 bits	16 bits	16 bits
	Channels		-	-	1	2	2 (Waveform Output)	2 (Waveform Output)	2 (Waveform Output)
	Onboard FIFO		-	-	-	-	4,096 samples	4,096 samples	4,096 samples
	Output Range (V)		-	-	0 ~ 5, 0 ~ 10	0 ~ 5, 0 ~ 10, ±5, ±10	0 ~ 5, 0 ~ 10, ±5, ±10	0 ~ 5, 0 ~ 10, ±5, ±10	0 ~ 5, 0 ~ 10, ±5, ±10
	Output Rate		-	-	Static update	250 kS/s	500 kS/s/s	3 MS/s	3 MS/s
	DMA Transfer		-	-	-	-	Bus-mastering	Bus-mastering	Bus-mastering
Digital I/O	Input Channels		16 (shared)	16 (shared)	16 (shared)	16 (shared)	24 (shared)	24 (shared)	24 (shared)
	Output Channels								
Timer/ Counter	Channels		1	1	1	3	2	2	2
	Resolution		16 bits	16 bits	16 bits	16 bits	32-bit	32-bit	32-bit
	Max. Input Frequency		10 MHz	10 MHz	10 MHz	10 MHz	10 MHz	10 MHz	10 MHz
Isolation Voltage			-	-	-	-	-	-	-
Auto Calibration			-	-	-	✓	✓	✓	✓
BoardID Switch			-	-	-	-	✓	✓	✓
Dimensions (mm)			96 x 90	96 x 90	96 x 90	96 x 90	168 x 100	168 x 100	168 x 100
Connector			2 x 20-pin	2 x 20-pin	2 x 20-pin	50-pin/26-pin box header	68-pin SCSI	68-pin SCSI	68-pin SCSI
Legacy Driver	Windows XP/2000		✓	✓	✓	✓	-	-	-
	WinCE		✓	✓	✓	-	-	-	-
	Linux		✓	✓	✓	-	-	-	-
DAQNavi Driver	Windows 8/7/Vista/ XP/2000		✓	✓	✓	✓	✓	✓	✓
	WinCE		-	-	-	-	-	-	-
	Linux		-	-	-	✓	-	-	-
LabVIEW Driver			✓	✓	✓	✓	✓	✓	✓
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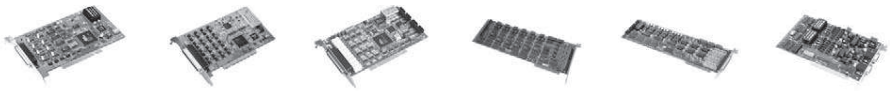
* 80 kHz on Pentium 4-based (or upper) system
** SS: Single DMA channel, Single A/D channel scan

Category			Analog Input							Analog Output	
Bus			PCI					ISA	PCI-104	PCI	
Model			PCI-1713U	PCI-1714U	PCI-1714UL	PCI-1715U	PCI-1747U	PCL-813B	PCM-3813I	PCI-1720U	PCI-1721
Analog Input	General Spec.	Resolution	12 bits	12 bits	12 bits	12 bits	16 bits	12 bits	12 bits	-	-
		Channels	32 SE/16 Diff.	4 SE	4 SE	32 SE/16 Diff.	64 SE/32 Diff.	32 SE	32 SE/16 Diff.	-	-
		Onboard FIFO	4,096 samples	32,768 samples	8,192 samples	1,024 samples	1,024 samples	-	1,024 samples	-	-
		Sampling Rate	100 kS/s	30 MS/s	10 MS/s	500 kS/s	250 kS/s	25 kS/s	100 kS/s	-	-
	Input Ranges	Unipolar Inputs (V)	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	-	-	0 ~10, 0 ~ 5 0 ~ 2.5, 0 ~1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	-	-
		Bipolar Inputs (V)	±10, 5, 2.5, 1.25, 0.625	±5, 2.5, 1, 0.5	±5, 2.5, 1, 0.5	±10, 5, 2.5, 1.25, 0.625	±10, 5, 2.5, 1.25, 0.625	±5, 2.5, 1.25, 0.625	±5, 2.5, 1.25, 0.625	-	-
		Configurable Per-Channel	✓	✓	✓	✓	✓	✓	✓	-	-
	Trigger Modes	Pacer/ Software/ External Pulse	✓	✓	✓	✓	Pacer/ Software	Software	✓	-	-
		Analog Slope	-	✓	✓	-	-	-	-	-	-
		Advanced Trigger	-	✓	✓	-	-	-	-	-	-
	Data Transfer Modes	Software	✓	✓	✓	✓	✓	✓	✓	-	-
		DMA	-	Bus-mastering	Bus-mastering	Bus-mastering	Bus-mastering	-	-	-	-
Analog Output	Resolution		-	-	-	-	-	-	-	12 bits	12 bits
	Channels		-	-	-	-	-	-	-	4	4 (Waveform Output)
	Onboard FIFO		-	-	-	-	-	-	-	-	1,024 samples
	Output Range (V)		-	-	-	-	-	-	-	0 ~ 5, 0 ~ 10, ±5, ±10, 0 ~ 20 mA, 4 ~ 20 mA	0 ~ 5, 0 ~ 10, ±5, ±10, 0 ~ 20 mA, 4 ~ 20 mA
	Output Rate		-	-	-	-	-	-	-	Static update	10 MS/s
	DMA Transfer		-	-	-	-	-	-	-	-	Bus-mastering
Digital I/O	Input Channels		-	-	-	-	-	-	-	-	16 (shared)
	Output Channels		-	-	-	-	-	-	-	-	
Timer/ Counter	Channels		-	-	-	-	-	-	-	-	1
	Resolution		-	-	-	-	-	-	-	-	16 bits
	Max. Input Frequency		-	-	-	-	-	-	-	-	10 MHz
Isolation Voltage			2,500 V_{DC}	-	-	2,500 V_{DC}	-	500 V_{DC}	2,500 V_{DC}	2,500 V_{DC}	-
Auto Calibration			-	✓	✓	-	✓	-	-	-	✓
BoardID Switch			-	✓	✓	✓	✓	-	-	✓	✓
Dimensions (mm)			175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	219 x 100	96 x 90	175 x 100	175 x 100
Connector			DB37	4 x BNC	4 x BNC	DB37	68-pin SCSI	DB37	40-pin	DB37	68-pin SCSI
Legacy Driver	Windows XP/2000		✓	✓	✓	✓	✓	✓	✓	✓	✓
	WinCE		✓	-	-	-	✓	-	-	✓	-
	Linux		✓	v	✓	-	✓	-	-	✓	✓
DAQNavi Driver	Windows 8/7/Vista/ XP/2000		✓	✓	✓	✓	✓	✓	✓	✓	✓
	WinCE		-	-	-	-	-	-	-	✓	-
	Linux		-	✓	✓	✓	✓	-	-	-	✓
LabVIEW Driver			✓	✓	✓	✓	✓	✓	✓	✓	✓
Page			19-29	19-28	19-28	19-29	19-30	online	19-47	19-31	19-32

* 80 kHz on Pentium 4-based (or upper) system
** SS: Single DMA channel, Single A/D channel scan

Digital I/O & Counter Card Selection Guide



Category			Analog Output					
Bus			PCI			ISA		
Model			PCI-1723	PCI-1724U	PCI-1727U	PCL-726	PCL-727	PCL-728
Analog Input	General Spec.	Resolution	-	-	-	-	-	-
		Channels	-	-	-	-	-	-
		Onboard FIFO	-	-	-	-	-	-
		Sampling Rate	-	-	-	-	-	-
	Input Ranges	Unipolar Inputs (V)	-	-	-	-	-	-
		Bipolar Inputs (V)	-	-	-	-	-	-
		Configurable Per-Channel	-	-	-	-	-	-
	Trigger Modes	Pacer/Software/ External Pulse	-	-	-	-	-	-
		Analog Slope	-	-	-	-	-	-
		Advanced Trigger	-	-	-	-	-	-
	Data Transfer Modes	Software	-		-	-	-	-
		DMA	-	-	-	-	-	-
Analog Output	Resolution		16 bits	14 bits	14 bits	12 bits	12 bits	12 bits
	Channels		8	32	12	6	12	2
	Onboard FIFO		-	-	-	-	-	-
	Output Range (V)		±10, 0 ~ 20 mA, 4 ~ 20 mA	±10, 0 ~ 20 mA	±10, 0~20 mA	0 ~ 5, 0 ~ 10, ±5, ±10, 4 ~ 20 mA	0 ~ 5, 0 ~ 10, ±5, 4 ~ 20 mA	0 ~ 5, 0 ~ 10, ±5, ±10, 0 ~ 20 mA, 4 ~ 20 mA
	Output Rate		Static update	Static update	Static update	Static update	Static update	Static update
	DMA Transfer		-	-	-	-	-	-
Digital I/O	Input Channels		16 (shared)	-	16	16	16	-
	Output Channels			-	16	16	16	-
Timer/ Counter	Channels		-	-	-	-	-	-
	Resolution		-	-	-	-	-	-
	Max. Input Frequency		-	-	-	-	-	-
Isolation Voltage			-	1,500 V_{DC}	-	-	-	2,500 V_{DC}
Auto Calibration			✓	-	-	-	-	-
BoardID Switch			✓	✓	✓	-	-	-
Dimensions (mm)			175 x 100	175 x 100	175 x 100	337 x 112	337 x 112	185 x 120
Connector			68-pin SCSI	DB62	2 x 2-pin, DB37	4 x 20-pin	2 x 20-pin, DB37	2 x DB9
Legacy Driver	Windows XP/2000		✓	✓	✓	✓	✓	✓
	WinCE		-	✓	-	-	-	-
	Linux		✓	✓	✓	-	-	-
DAQNavi Driver	Windows 8/7/Vista/XP/2000		✓	✓	✓	-	-	-
	WinCE		-	-	-	-	-	-
	Linux		-	✓	✓	-	-	-
LabVIEW Driver			✓	✓	✓	✓	✓	✓
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Category			Non-Isolated Digital I/O						
Bus			PCI						
Model			PCI-1735U	PCI-1737U	PCI-1739U	PCI-1751	PCI-1753	PCI-1755	PCI-1757UP
TTL DI/O	Input Channels		32	24 (shared)	48 (shared)	48 (shared)	96 (shared)	32 (shared)	24 (shared)
	Output Channels		32						
	Output Channel	Sink Current	24 mA @ 0.5V	24 mA @ 0.4 V	24 mA @ 0.4 V	24 mA @ 0.4 V	24 mA @ 0.44 V	24 mA @ 0.5V	24 mA @ 0.5 V
		Source Current	15 mA @ 2.0V	15 mA @ 2.4 V	15 mA @ 2.4 V	15 mA @ 2.4 V	24 mA @ 3.76 V	15 mA @ 2.0V	24 mA @ 3.7 V
Isolated DI/O	Input	Channels	-	-	-	-	-	-	-
		Isolation Voltage	-	-	-	-	-	-	-
		Input Range	-	-	-	-	-	-	-
	Output	Channels	-	-	-	-	-	-	-
		Isolation Voltage	-	-	-	-	-	-	-
		Output Range	-	-	-	-	-	-	-
		Max. Sink Current	-	-	-	-	-	-	-
Timer/ Counter	Channels		3	-	-	3	-	3	-
	Resolution		16 bits	-	-	16 bits	-	16 bits	-
	Max. Input Frequency		10 MHz	-	-	10 MHz	-	10 MHz	-
Advanced Function	Pattern Match		-	-	-	-	✓	✓	-
	Change of State		-	-	-	-	✓	✓	-
	BoardID Switch		✓	✓	✓	✓	✓	✓	✓
	Channel-Freeze Function		-	-	-	-	-	✓	-
	Output Status Read Back		✓	✓	✓	✓	✓	-	✓
	Dry/Wet Contact*		-	✓	✓	✓	✓	-	✓
Dimensions (mm)			175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	120 x 65
Connector			5 x 20-pin	1 x 50-pin	2 x 50-pin	68-pin SCSI	100-pin SCSI	100-pin SCSI-II	1 x DB25
Legacy Driver	Windows XP/2000		✓	✓	✓	✓	✓	✓	✓
	WinCE		-	-	-	-	-	-	-
	Linux		✓	✓	✓	✓	✓	-	✓
DAQNavi Driver	Windows 8/7/Vista/ XP/2000		✓	✓	✓	✓	✓	-	✓
	WinCE		-	-	-	-	-	-	-
	Linux		-	-	-	✓	-	-	-
LabVIEW Driver			✓	✓	✓	✓	✓	✓	✓
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* Dry/wet contact can be mixed at the same time within one group.

Digital I/O & Counter Card Selection Guide

Category			Non-Isolated Digital I/O					
Bus			ISA				PC/104	PCI-104
Model			PCL-720+	PCL-722	PCL-724	PCL-731	PCM-3724	PCM-3753I
TTL DI/O	Input Channels		32	144 (shared)	24 (shared)	48 (shared)	48 (shared)	96 (shared)
	Output Channels		32					
	Output Channel	Sink Current	24 mA @ 0.5 V	24 mA @ 0.4 V	24 mA @ 0.4 V	24 mA @ 0.4 V	24 mA @ 0.5 V	24 mA @ 0.4 V
		Source Current	15 mA @ 2.0 V	-15 mA @ 2.4 V	15 mA @ 2.4 V	15 mA @ 2.4 V	15 mA @ 2.0 V	15 mA @ 2.4 V
Isolated DI/O	Input	Channels	-	-	-	-	-	-
		Isolation Voltage	-	-	-	-	-	-
		Input Range	-	-	-	-	-	-
	Output	Channels	-	-	-	-	-	-
		Isolation Voltage	-	-	-	-	-	-
		Output Range	-	-	-	-	-	-
		Max. Sink Current	-	-	-	-	-	-
Timer/ Counter	Channels		3	-	-	-	-	-
	Resolution		16 bits	-	-	-	-	-
	Max. Input Frequency		1 MHz	-	-	-	-	-
Advanced Function	Pattern Match		-	-	-	-	-	✓
	Change of State		-	-	-	-	-	✓
	BoardID Switch		-	-	-	-	-	-
	Channel-Freeze Function		-	-	-	-	-	-
	Output Status Read Back		-	✓	✓	✓	✓	✓
	Dry/Wet Contact*		-	-	-	-	-	-
Dimensions (mm)			185 x 100	334 x 100	125 x 100	185 x 100	96 x 90	96 x 90
Connector			5 X 20-pin	6 x 50-pin	1 x 50-pin	2 x 50-pin	2 x 50-pin	4 x 50-pin
Legacy Driver	Windows XP/2000		✓	✓	✓	✓	✓	✓
	WinCE		-	-	-	-	✓	✓
	Linux		-	-	-	-	✓	✓
DAQNavi Driver	Windows 8/7/Vista/XP/2000		-	-	-	-	✓	✓
	WinCE		-	-	-	-	-	-
	Linux		-	-	-	-	-	-
LabVIEW Driver			✓	✓	✓	✓	✓	✓
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* Dry/wet contact can be mixed at the same time within one group.

Category			Isolated Digital I/O					Non-isolated Digital I/O	
Bus			PCI Express						
Model			PCIE-1730	PCIE-1752	PCIE-1754	PCIE-1756	PCIE-1760	PCIE-1751	PCIE-1753
TTL DI/O	Input Channels		16	-	-	-	-	48 (shared)	96 (shared)
	Output Channels		16	-	-	-	-		
	Output Channel	Sink Current	24 mA @ 0.5 V	-	-	-	-	15 mA @ 0.8 V	15 mA @ 0.8 V
		Source Current	15 mA @ 2.4 V	-	-	-	-	15 mA @ 2.0 V	15 mA @ 2.0 V
Isolated DI/O	Input	Channels	16	-	64	32	8	-	-
		Isolation Voltage	2,500 V_{DC}	-	2,500 V_{DC}	2,500 V_{DC}	2,500 V_{DC}	-	-
		Input Range	10 ~ 30 V_{DC}	-	10 ~ 30 V_{DC}	10 ~ 30 V_{DC}	4.5 ~ 12 V_{DC}	-	-
	Output	Channels	16 (Sink)	64 (Sink)	-	32 (Sink)	6 x Form A 2 x Form C	-	-
		Isolation Voltage	2,500 V_{DC}	2,500 V_{DC}	-	2,500 V_{DC}	2,500 V_{DC}	-	-
		Output Range	5 ~ 40 V_{DC}	5 ~ 40 V_{DC}	-	5 ~ 40 V_{DC}	1 A @ 125 V_{AC} 2 A @ 30 V_{AC}	-	-
		Max. Sink Current	500 mA	500 mA	-	500 mA		-	-
Timer/ Counter	Channels		-	-	-	-	8 x UP CTR 2 x PWM	3	-
	Resolution		-	-	-	-	16 bits	32 bits	-
	Max. Input Frequency		-	-	-	-	500 Hz	10 MHz	-
Advanced Function	Pattern Match		-	-	-	-	✓	✓	✓
	Change of State		-	-	-	-	✓	✓	✓
	BoardID Switch		✓	✓	✓	✓	✓	✓	✓
	Channel-Freeze Function		✓	✓	-	✓	-	-	-
	Output Status Read Back		✓	✓	-	✓	✓	✓	✓
	Dry/Wet Contact*		✓	-	-	-	-	✓	✓
Dimensions (mm)			168 x 100	168 x 100	168 x 100	168 x 100	168 x 100	168 x 100	168 x 100
Connector			1 x DB37 4 x 20-pin	100-pin SCSI	100-pin SCSI	100-pin SCSI	1 x DB37	68-pin SCSI	68-pin SCSI
Legacy Driver	Windows XP/2000		-	-	-	-	-	-	-
	WinCE		-	-	-	-	-	-	-
	Linux		-	-	-	-	-	-	-
DAQNavi Driver	Windows 8/7/Vista/XP/2000		✓	✓	✓	✓	✓	✓	✓
	WinCE		-	-	-	-	-	-	-
	Linux		-	-	-	-	✓	-	-
LabVIEW Driver			✓	✓	✓	✓	✓	✓	✓
Page			19-17	19-19	19-19	19-19	19-20	19-18	19-18

* Dry/wet contact can be mixed at the same time within one group.

Digital I/O & Counter Card Selection Guide

Category			Isolated Digital I/O					
Bus			PCI					
Model			PCI-1730U	PCI-1733	PCI-1734	PCI-1750	PCI-1752U	PCI-1754
TTL DI/O	Input Channels		16	-	-	-	-	-
	Output Channels		16	-	-	-	-	-
	Output Channel	Sink Current	24 mA @ 0.5 V	-	-	-	-	-
		Source Current	15 mA @ 2.4 V	-	-	-	-	-
Isolated DI/O	Input	Channels	16	32	-	16	-	64
		Isolation Voltage	2,500 V_{DC}	2,500 V_{DC}	-	2,500 V_{DC}	-	2,500 V_{DC}
		Input Range	5 ~ 30 V_{DC}	5 ~ 30 V_{DC}	-	5 ~ 50 V_{DC}	-	10 ~ 50 V_{DC}
	Output	Channels	16 (Sink)	-	32 (Sink)	16 (Sink)	64 (Sink)	-
		Isolation Voltage	2,500 V_{DC}	-	2,500 V_{DC}	2,500 V_{DC}	2,500 V_{DC}	-
		Output Range	5 ~ 40 V_{DC}	-	5 ~ 40 V_{DC}	5 ~ 40 V_{DC}	5 ~ 40 V_{DC}	-
		Max. Sink Current	300 mA	-	200 mA	200 mA	200 mA	-
Timer/ Counter	Channels		-	-	-	1	-	-
	Resolution		-	-	-	16 bits	-	-
	Max. Input Frequency		-	-	-	1 MHz	-	-
Advanced Function	Pattern Match		-	-	-	-	-	-
	Change of State		-	-	-	-	-	-
	BoardID Switch		✓	✓	✓	-	✓	✓
	Channel-Freeze Function		✓	-	-	-	✓	-
	Output Status Read Back		✓	-	✓	-	✓	-
	Dry/Wet Contact*		✓	✓	-	✓	-	-
Dimensions (mm)			175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100
Connector			1 x DB37 4 x 20-pin	1 x DB37	1 x DB37	1 x DB37	100-pin SCSI	100-pin SCSI
Legacy Driver	Windows XP/2000		✓	✓	✓	✓	✓	✓
	WinCE		✓	-	✓	✓	✓	✓
	Linux		✓	✓	✓	✓	✓	✓
DAQNavi Driver	Windows 8/7/Vista/XP/2000		✓	✓	✓	✓	✓	✓
	WinCE		-	-	-	-	-	-
	Linux		✓	-	-	✓	✓	-
LabVIEW Driver			✓	✓	✓	✓	✓	✓
Page			19-39	19-39	19-39	19-40	19-41	19-41

* Dry/wet contact can be mixed at the same time within one group.

Category			Isolated Digital I/O						
Bus			PCI						
Model			PCI-1756	PCI-1758UDI	PCI-1758UDO	PCI-1758UDIO	PCI-1760U	PCI-1761	PCI-1762
TTL DI/O	Input Channels		-	-	-	-	-	-	-
	Output Channels		-	-	-	-	-	-	-
	Output Channel	Sink Current	-	-	-	-	-	-	-
		Source Current	-	-	-	-	-	-	-
Isolated DI/O	Input	Channels	32	128	-	64	8	8	16
		Isolation Voltage	2,500 V_{DC}	2,500 V_{RMS}	-	2,500 V_{DC}	2,500 V_{DC}	3,750 V_{DC}	2,500 V_{DC}
		Input Range	10 ~ 50 V_{DC}	5 ~ 25 V_{DC}	-	5 ~ 25 V_{DC}	4.5 ~ 12 V_{DC}	5 ~ 50 V_{DC}	10 ~ 50 V_{DC}
	Output	Channels	32 (Sink)	-	128	64	6 x Form A 2 x Form C	4 x Form A 4 x Form C	16**
		Isolation Voltage	2,500 V_{DC}	-	2,500 V_{RMS}	2,500 V_{DC}	2,500 V_{DC}	2,500 V_{DC}	2,500 V_{DC}
		Output Range	5 ~ 40 V_{DC}	-	5 ~ 40 V_{DC}	5 ~ 40 V_{DC}	1 A @ 125 V_{AC} 2 A @ 30 V_{DC}	8 A @ 250 V_{AC} 2 A @ 30 V_{DC}	0.25 A @ 250 V_{AC} 2 A @ 30 V_{DC}
		Max. Sink Current	200 mA	-	90 mA	90 mA			
Timer/Counter	Channels		-	-	-	-	8 x Up CTR 2 x PWM	-	-
	Resolution		-	-	-	-	16 bits (2,500 Isolation)	-	-
	Max. Input Frequency		-	-	-	-	500 Hz for Up CTR	-	-
Advanced Function	Pattern Match		-	-	-	-	✓	-	-
	Change of State		-	-	-	-	✓	-	-
	BoardID Switch		✓	✓	✓	✓	✓	✓	✓
	Channel-Freeze Function		✓	-	-	-	-	-	✓
	Output Status Read Back		✓	-	✓	✓	✓	✓	✓
	Dry/Wet Contact*		-	-	-	-	-	-	-
Dimensions (mm)			175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100	175 x 100
Connector			100-pin SCSI	Dual 100-pin mini-SCSI	Dual 100-pin mini-SCSI	Dual 100-pin mini-SCSI	1 x DB37	1 x DB37	1 x DB62
Legacy Driver	Windows XP/2000		-	✓	✓	✓	-	✓	✓
	WinCE		✓	✓	✓	✓	✓	✓	✓
	Linux		-	✓	✓	v	-	✓	✓
DAQNavi Driver	Windows 8/7/Vista/XP/2000		✓	✓	✓	✓	✓	✓	✓
	WinCE		-	-	-	-	-	-	-
	Linux		-	✓	✓	✓	-	✓	✓
LabVIEW Driver			✓	✓	✓	✓	✓	✓	✓
Page			19-41	19-42	19-42	19-42	19-43	19-43	19-43

* Dry/wet contact can be mixed at the same time within one group.

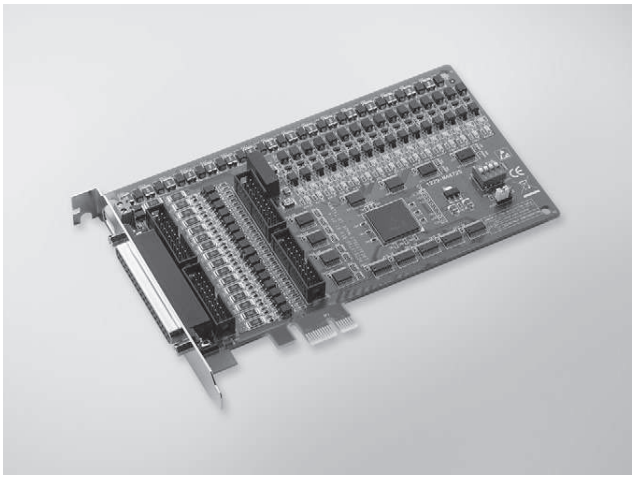
Digital I/O & Counter Card Selection Guide

Category			Isolated Digital I/O						Counter		
Bus			ISA		PC/104		PCI-104		PCI	ISA	PC/104
Model			PCL-725	PCL-735	PCM-3725	PCM-3730	PCM-3730I	PCM-3761I	PCI-1780U	PCL-836	PCM-3780
TTL DI/O	Input Channels		-	-	8	16	-	-	8	16	24 (shared)
	Output Channels		-	-	8	16	-	-	8	16	
	Output Channel	Sink Current	-	-	-	0.5 V @ 8 mA	-	-	24 mA @ 0.5 V	8 mA @ 0.5 V	24 mA @ 0.5 V
		Source Current	-	-	-	0.4 mA @ 2.4 V	-	-	15 mA @ 2.4 V	0.4 mA @ 2.4 V	15 mA @ 2.0 V
Isolated DI/O	Input	Channels	8	-	8	8	16	8	-	-	-
		Isolation Voltage	1,500 V_{DC}	-	2,500 V_{DC}	2,500 V_{DC}	2,500 V_{DC}	2,500 V_{DC}	-	-	-
		Input Range	5 ~ 24 V_{DC}	-	10 ~ 50 V_{DC}	5 ~ 24 V_{DC}	5 ~ 30 V_{DC}	5 ~ 30 V_{DC}	-	-	-
	Output	Channels	4 x Form A 4 x Form C	12 x Form C	8 x Form C	8	16	8 x Form C	-	-	-
		Isolation Voltage	1,000 V_{DC}	1,000 V_{DC}	2,000 V_{DC}	2,500 V_{DC}	2,500 V_{DC}	2,000 V_{DC}	-	-	-
		Output Range	0.5A @ 120 V_{AC} 1A @ 30 V_{DC}	1A @ 125 V_{AC} 2A @ 30 V_{DC}	0.25A @ 240 V_{DC} 1A @ 30 V_{DC}	5 ~ 40 V_{DC}	5 ~ 30 V_{DC}	0.25 A @ 250 V_{AC} 2 A @ 30 V_{DC}	-	-	-
		Max. Sink Current				200 mA	300 mA		-	-	-
Timer/ Counter	Channels		-	-	-	-	-	-	8 x CTR	6 x CTR 3 x PWM	2
	Resolution		-	-	-	-	-	-	16 bits	16 bits	16 bits
	Max. Input Frequency		-	-	-	-	-	-	20 MHz	10 MHz	20 MHz
Advanced Function	Pattern Match		-	-	-	-	-	-	-	-	-
	Change of State		-	-	-	-	-	-	-	-	-
	BoardID Switch		-	-	-	-	-	✓	✓	-	-
	Channel-Freeze Function		-	-	-	-	-	-	-	-	-
	Output Status Read Back		-	-	-	-	-	✓	-	-	-
	Dry/Wet Contact*		-	-	-	-	-	-	-	-	-
Dimensions (mm)			147 x 95	155 x 100	96 x 90	96 x 90	96 x 90	96 x 90	175 x 100	185 x 100	96 x 90
Connector			1 x DB37	1 x DB37	1 x 20-pin 1 x 50-pin	3 x 20-pin	2 x 20-pin	1 x 20-pin 1 x 50-pin	68-pin SCSI	1 x DB37 2 x 20-pin	1 x 50-pin 1 x 20-pin
Legacy Driver	Windows XP/2000		✓	✓	✓	✓	✓	✓	✓	✓	✓
	WinCE		-	-	✓	✓	✓	✓	-	-	✓
	Linux		-	-	✓	✓	✓	✓	✓	-	-
DAQNavi Driver	Windows 8/7/Vista/ XP/2000		-	-	✓	✓	✓	✓	✓	-	✓
	WinCE		-	-	-	-	-	-	-	-	-
	Linux		-	-	-	-	-	✓	-	-	-
LabVIEW I/O Driver			✓	✓	✓	✓	✓	✓	✓	✓	✓
Page			online	online	19-50	19-50	19-50	19-48	19-44	online	19-50

* Dry/wet contact can be mixed at the same time within one group.
** Jumper selectable Form A/Form B-type relay output

PCIE-1730

32-ch TTL and 32-ch Isolated Digital I/O PCI Express Card



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Features

- 32-ch isolated DI/O (16-ch digital input, 16-ch digital output)
- 32-ch TTL DI/O (16-ch digital input,16-ch digital output)
- High output driving capacity
- Interrupt handling capability
- 2 x 20-pin connectors for isolated DI/O channels and 2 for TTL DI/O channels
- D-type connector for isolated input and output channels
- High-voltage isolation on output channels (2,500 V_{DC})

Introduction

PCIE-1730 offers isolated digital input channels as well as isolated digital output channels with isolation protection up to 2,500 V_{DC}, which makes them ideal for industrial applications where high-voltage isolation is required. There are also 32 TTL digital I/O channels on PCIE-1730.

Specifications

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Interrupt Capable Ch.** 2 (DI0, DI8)

Isolated Digital Input

- **Channels** 16
- **Input Voltage** Logic 0: 3 V max.
Logic 1: 10 V min. (30 V max.)
- **Interrupt Capable Ch.** 2 (IDI0, IDI8)
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 50 µs
- **Input Resistance** 2.7 kΩ @ 1 W

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Output Capability** Sink: 24 mA @ 0.8 V
Source: 15 mA @ 2.0 V

Isolated Digital Output

- **Channels** 16
- **Output Type** Sink type (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 500 mA max./channel
- **Opto-Isolator Response** 50 µs

General

- **Bus Type** PCI Express V1.0
- **I/O Connectors** 1 x DB37 female connector
4 x 20-pin box header
- **Dimensions (L x H)** 168 x 100 mm (6.6" x 3.9")
- **Power Consumption** Typical:3.3 V @ 280 mA, 12 V @ 330 mA
Max.: 3.3 V @ 420 mA, 12 V @ 400 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -25 ~ 85°C (-13 ~ 185°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

- **PCIE-1730** 32-ch Isolated Digital I/O PCIe Card

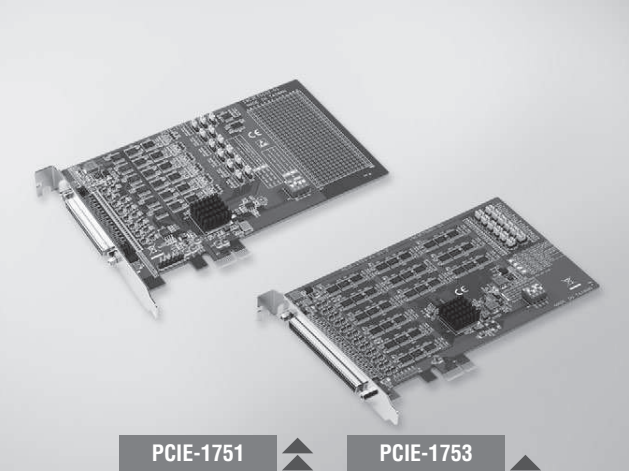
Accessories

- **PCL-10120-1E** 20-pin Flat Cable, 1 m
- **PCL-10120-2E** 20-pin Flat Cable, 2 m
- **ADAM-3920** 20-pin DIN-rail Flat Cable Wiring Board
- **PCLD-782** 16-ch Isolated DI Board w/ 1m 20-pin Flat Cable
- **PCLD-885** 16-ch Power Relay Board w/ 20p & 50p Flat Cables
- **PCLD-785** 16-ch Relay Board w/ One 1m 20-pin Flat Cable
- **ADAM-3937** DB37 DIN-rail Wiring Board
- **PCL-10137-1E** DB37 Cable, 1 m
- **PCL-10137-2E** DB37 Cable, 2 m
- **PCL-10137-3E** DB37 Cable, 3 m

PCIE-1751
PCIE-1753

48-ch Digital I/O and 3-ch Counter PCI Express Card

96-ch Digital I/O PCI Express Card



Features

- Emulates mode 0 of 8255 PPI (every port with nibble)
- Buffered circuits for higher driving capacity than the 8255
- Interrupt handling capability
- Timer/Counter interrupt capability
- Supports both dry and wet contact
- Keeps the I/O port setting and DO state after system reset
- BoardID switch
- Pattern match interrupt function for DI
- "Change of state" interrupt function for DI
- Programmable digital filter function for DI
- Output status read back

Introduction

PCIE-1751 is a 48-bit digital I/O card for the PCI Express bus. Its 48 channels are divided into six 8-bit I/O ports and users can configure each 4-channel per port (nibble) as input or output via software. PCIE-1751 also provides three 32-bit counters..

Specifications

Digital Input

- **Channels** 48 (shared with output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2 V min.
- **Interrupt Capable Ch.** 6

Digital Output

- **Channels** 48 (shared with input)
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.4 V max.
  Logic 1: 2.4 V min.
- **Output Capability** Sink: 15 mA @ 0.8 V
  Source: 15 mA @ 2.0 V

Counter/Timer

- **Channels** 3
- **Resolution** 3 x 32-bit counter
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Reference Clock** Internal: 20K / 200K / 2M / 20MHz
  External Clock Frequency: 10 MHz
  External Voltage Range: 5 V/TTL

General

- **Bus Type** Universal PCI Express
- **I/O Connectors** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 168 x 100 mm (6.6" x 3.9")
- **Power Consumption** Typical: 3.3 V @ 850 mA
  Max.: 3.3V @ 2.63 A
  Note: The maximum power consumption includes power consumption for +5 V output (on pin 34 and pin 68, with 0.5 A)
- **Operating Temperature** 0~60°C (32~140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

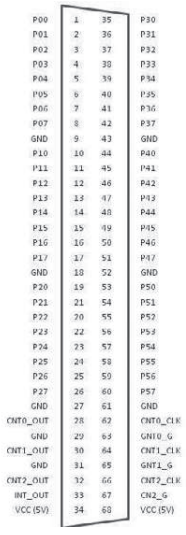
Ordering Information

- **PCIE-1751** 48-ch Digital I/O and 3-ch Counter PCI Express

Accessories

- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board
- **ADAM-3968/20** 68-pin SCSI to 3 20-pin Box Header Board
- **ADAM-3968/50** 68-pin SCSI to 2 50-pin Box Header Board
- **PCLD-8751** 48-ch Isolated Digital Input Board
- **PCLD-8761** 24-ch Replay/ Isolated Digital Input Board
- **PCLD-8762** 48-ch Relay Board

Pin Assignment

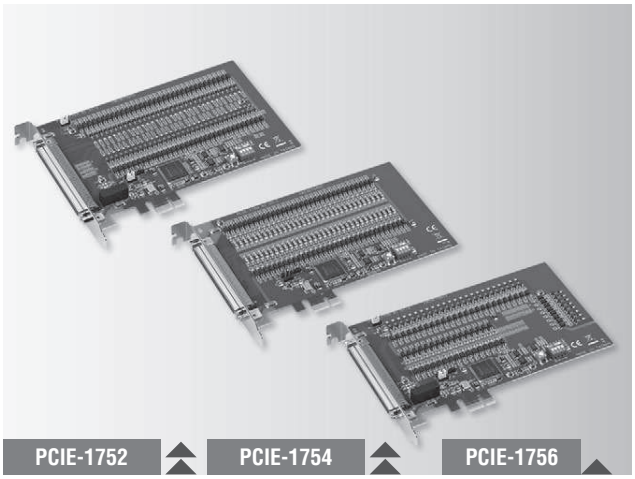


PCIE-1752
PCIE-1754
PCIE-1756

64-ch Isolated Digital Output PCI Express Card

64-ch Isolated Digital Input PCI Express Card

64-ch Isolated Digital I/O PCI Express Card



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Features

PCIE-1752/1756

- Wide output range (5 ~ 40 V_{DC})
- High sink current on isolated output channels (500mA max./ch)
- 2,000 V_{DC} ESD protection
- High-voltage isolation (2,500 V_{DC})
- Interrupt handling capability

PCIE-1754/1756

- Wide input range (10 ~ 30 V_{DC})
- Either +/- voltage input for DI by group
- High over-voltage protection (70 V_{DC})
- High-voltage isolation (2,500 V_{DC})
- Output status read-back
- Keeps the output settings and values after system hot reset
- Channel-freeze function

Introduction

The Advantech PCIE-1752, PCIE-1754 and PCIE-1756 series products offer 64 isolated digital input and output channels with 2,500 V_{DC} isolation protection. They feature a wide input range (10 ~ 30 V_{DC}), wide output range (5 ~ 40 V_{DC}) and high sink current (500mA max./channel) can make PCIE-1752/1754/1756 series products easily used in industrial automation control systems. With the help of the latest Advantech driver - DAQNavi, users can perform the configuration and setting easily and efficiently in the programming.

Specifications

Isolated Digital Input

- **Channels** PCIE-1754: 64
PCIE-1756: 32
- **Input Voltage** Logic 0: 3 V max.
Logic 1: 10 V min. (30 V_{DC} max.)
- **Input Current** 10 V_{DC} @ 2.97 mA
20 V_{DC} @ 6.35 mA
30 V_{DC} @ 9.73 mA
- **Interrupt Capable Ch.** PCIE-1754: 4
PCIE-1756: 2
- **Isolation Protection** 2,500 V_{DC}
- **Overvoltage Protection** 70 V_{DC}
- **ESD Protection** 2,000 V_{DC}
- **Opto-Isolator Response** 50 µs

Isolated Digital Output

- **Channels** PCIE-1752: 64
PCIE-1756: 32
- **Output Type** Sink (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 500 mA max./channel
- **Opto-isolator Response** 50 µs

General

- **Bus Type** PCI Express V1.0
- **I/O Connectors** 1 x 100-pin SCSI female connector
- **Dimensions (L x H)** 168 x 100 mm (6.6" x 3.9")
- **Power Consumption**
PCIE-1752
Typical: 3.3 V @ 485 mA
Max.: 3.3 V @ 530 mA; 12V @ 90 mA
PCIE-1754
Typical: 3.3 V @ 285 mA
Max.: 3.3 V @ 330 mA
PCIE-1756
Typical: 3.3 V @ 385 mA
Max.: 3.3 V @ 430 mA; 12V @ 55 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

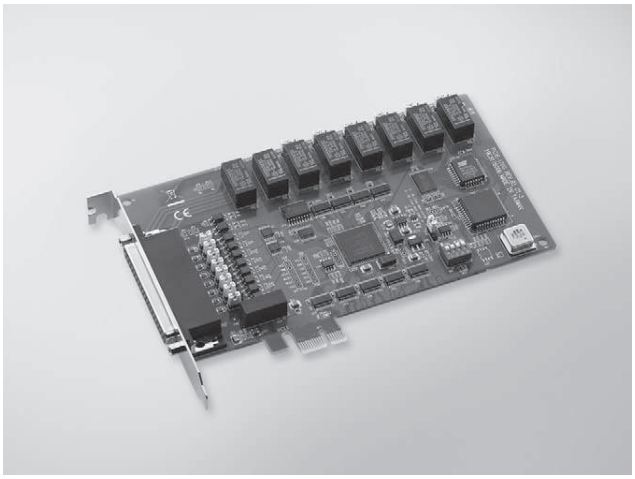
- **PCIE-1752** 64-ch Isolated Digital Output PCI Express Card
- **PCIE-1754** 64-ch Isolated Digital Input PCI Express Card
- **PCIE-1756** 64-ch Isolated Digital I/O PCI Express Card

Accessories

- **PCL-10250-1E** 100-pin SCSI to Two 50-pin SCSI Cable, 1 m
- **PCL-10250-2E** 100-pin SCSI to Two 50-pin SCSI Cable, 2 m
- **ADAM-3951** 50-pin DIN-rail Wiring Board w/ LED Indicators
- **PCL-101100M-3E** 100-pin SCSI to 100-pin SCSI Cable, 3 m
- **ADAM-39100** 100-pin DIN-rail Wiring Board

PCIE-1760

8-ch Relay and 8-ch Isolated Digital Input PCI Express Card



Features

- 8 opto-isolated digital input channels with counter/timer function
- 8 relay actuator output channels
- 2 opto-isolated PWM outputs
- LED indicators to show activated relays
- Jumper selectable dry contact/wet contact input signals
- Up event counters for DI
- Programmable digital filter function for DI
- Pattern match interrupt function for DI
- "Change of state" interrupt function for DI
- BoardID switch

Introduction

PCIE-1760 relay actuator and isolated digital input card is a PC add-on card for the PCI Express bus. It meets the PCI Express standard Rev. 1.0. It provides 8 opto-isolated digital inputs with isolation protection of 2,500 V_{DC} for collecting digital inputs in noisy environments, 8 relay actuators that can be used as a on/off control devices or small power switches, and 2 isolated PWM (Pulse Width Modulation) outputs for custom applications.

For easy monitoring, each relay is equipped with one red LED to show its on/off status. Each isolated input supports both dry contact and wet contact so that it can easily interface with other devices when no voltage is present in the external circuit.

Specifications

Isolated Digital Input

- **Channels** 8
- **Input Voltage** Logic 0: 1.0 V max.
  Logic 1: 4.5 V min. (12 V max.)
- **Interrupt Capable Ch.** 8
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 25 µs
- **Input Resistance** 2 kΩ 1/4 W

Counter/Timer

- **Channels** 8
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 500 Hz
- **Isolation Protection** 2,500 V_{DC}
- **PWM Channels** 2
- **Digital Noise Filter** Min. effective high input period ≥ [(2 ~ 65535) x 5 ms] + 5 ms
  Min. effective low input period ≥ [(2 ~ 65535) x 5 ms] + 5 ms

Relay Output

- **Channels** 8
- **Relay Type** 2 x Form C, and 6 x Form A
- **Contact Rating** 1 A @ 125 V_{AC}, 2 A @ 30 V_{DC}
- **Max. Switching Power** 125 VA, 60 W
- **Max. Switching Voltage** 250 V_{AC}, 220 V_{DC}
- **Max. Switching Current** 2 A
- **Operate/Release Time** 5 / 3.5 ms max
- **Resistance** Contact: 50 mΩ max.
  Insulation: 100 MΩ min. @ 500 V_{DC}
- **Life Expectancy (Electrical)** 3 x 10^5 cycles min.: 2 A @ 30 V_{DC}, 1 A @ 125 V_{AC}
  10^6 cycles min.: 1 A @ 30 V_{DC}, 0.5 A @ 125 V_{AC}

General

- **Bus Type** PCI Express V1.0
- **I/O Connectors** 1 x DB37 female connector
- **Dimensions (L x H)** 168 x 100 mm (6.6" x 3.9")
- **Power Consumption** Typical: 5 V @ 450 mA
  Max.: 5 V @ 850 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95 % RH, non-condensing

Ordering Information

- **PCIE-1760** 8-ch Relay/IDI PCIe Card w/ 10-ch Counter/Timer

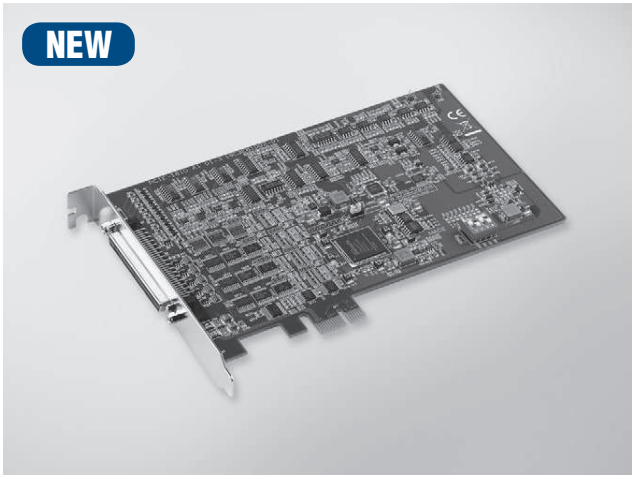
Accessories

- **PCL-10137-1E** DB37 Cable, 1 m
- **PCL-10137-2E** DB37 Cable, 2 m
- **PCL-10137-3E** DB37 Cable, 3 m
- **ADAM-3937** DB37 DIN-rail Wiring Board

PCIE-1810

800 kS/s, 12-bit, 16-ch PCI Express Multifunction DAQ Card

NEW



Features

- 16 analog inputs, up to 800 kS/s, 12-bit resolution
- 2 analog outputs, up to 500 kS/s, 12-bit resolution
- Support for digital trigger and analog trigger
- 24 programmable digital I/O lines
- Two 32-bit programmable counter/timers
- Onboard FIFO memory (4k samples)
- Automatic channel/gain scanning

Introduction

The PCIE-1810 is a multifunction PCI Express card that includes digital I/O, analog I/O and counter functions. It also features a 800 kS/s 12-bit A/D converter and supports analog trigger for A/D data accquisition.

Specifications

Analog Input

- **Channels** Single-ended 16-ch
  Differential 8-ch
- **Resolution** 12 bits
- **Sample Rate** Single Channel 800 kS/s max.
  Multi-Channel 500 kS/s max.

Note: The sampling rate for each channels will be affected by used channel number. For example, if 4 channels of PCIE-1810 are used, the sampling rate is 500k/4 = 125 kS/s per channel.

- **Trigger Reference** Digital Trigger, Analog Trigger
- **Trigger Mode** Start trigger, Delay to Start trigger
  Stop trigger, Delay to Stop trigger
- **FIFO Size** 4k samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 1 GΩ
- **Sampling Modes** Software and external clock
- **Input Range** Software programmable

Gain	0.5	1	2	4	8
Bipolar	±10V	±5	±2.5	±1.25	±0.625
Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Absolute Accuracy (% of FSR)*	0.1	0.1	0.2	0.2	0.4

Analog Output

- **Channels** 2
- **Resolution** 12 bits
- **Output Rate** 500 kS/s max.
- **Output Range** Software programmable

Internal Reference	Unipolar	0 ~ 5 V 0 ~ 10 V
	Bipolar	-5 V ~ 5 V -10 V ~ 10 V
External Reference		0 ~ +x V @ -x V (-10 ≤ x ≤ 10)

- **Slew Rate** 20 V/μs
- **Driving Capability** 5 mA
- **Operation Mode** Static update, Waveform generation
- **Accuracy** INLE: ± 1 LSB, DNLE: ± 1 LSB

Digital I/O

- **Channels** 24
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Capability** Sink: 15 mA @ 0.8 V
  Source: 15 mA @ 2.0 V

Counter

- **Channels** 2
- **Resolution** 32 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Pulse Generation** Yes
- **Timebase Stability** 50 ppm

General

- **Form factor** PCI Express x 1
- **Triggering** 12 bits Analog x 2 / Digital x 2
- **I/O Connector** 68-pin SCSI female connector
- **Dimensions (L x W)** 167 x 100 mm
- **Power Consumption** Typical: 3.3 V @ 488 mA
  12 V @ 112 mA
  Max.: 3.3 V @ 2.25 A
  12 V @ 390 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F) (refer to IEC 60068-2-1, 2)
- **Storage Temperature** -40 ~ 70°C (-40 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH non-condensing (refer to IEC 60068-2-3)

Ordering Information

- **PCIE-1810** 800 kS/s, 12-bit Multifunction Card

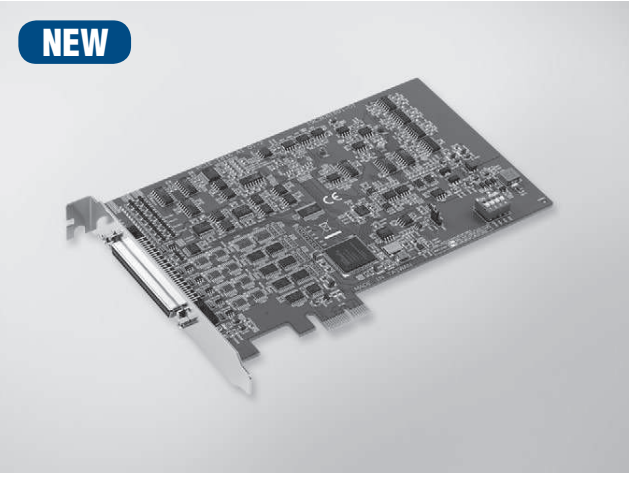
Accessories

- **PCL-10168H-1E** 68-pin SCSI Shielded Cable with Noise Rejecting, 1 m
- **PCL-10168H-2E** 68-pin SCSI Shielded Cable with Noise Rejecting, 2 m
- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

PCIE-1816
PCIE-1816H

1 MS/s, 16-bit, 16-ch PCI Express Multifunction DAQ Card

5 MS/s, 16-bit, 16-ch PCI Express Multifunction DAQ Card



FCC CE RoHS COMPLIANT 2002/95/EC

Features

PCIE-1816

- 16 analog inputs, up to 1 MS/s, 16-bit resolution

PCIE-1816H

- 16 analog inputs, up to 5 MS/s, 16-bit resolution

PCIE-1816/1816H

- 2 analog outputs up to 3 MS/s, 16-bit resolution
- Support Analog and Digital Trigger for AI/O
- Support Waveform generation for AO
- 24 programmable digital I/O lines
- Two 32-bit programmable counter/timers
- Onboard FIFO memory (4k samples)
- Support for Microsoft Windows 8 (desktop mode only)/7/XP

Introduction

PCIE-1816/1816H is a 16-ch, up to 5 MS/s multi-function DAQ card and integrates digital I/O, analog I/O, and counter functions. The PCIE-1816/1816H also features analog and digital triggering, 2-ch 16 bit analog outputs with waveform generation capability, 24-ch programmable digital I/O lines, and two 32-bit general-purpose timer/counters.

Specifications

Analog Input

- **Channels** Single-ended 16-ch; Differential 8-ch
- **Resolution** 16 bits
- **Sample Rate** PCIE-1816: Single Channel 1 MS/s max., Multi-Channel 500 kS/s max.; PCIE-1816H: Single Channel 5 MS/s max., Multi-Channel 1 MS/s max.

Note: The sampling rate for each channels will be affected by used channel number. For example, if 4 channels of PCIE-1816H are used, the sampling rate is 1M/4 = 250 kS/s per channel.

- **Trigger Reference** Analog Trigger, Digital Trigger
- **FIFO Size** 4k samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 1 GΩ
- **Sampling Mode** Software and external clock
- **Input Range** Software programmable

PCIE-1816					
Gain	0.5	1	2	4	8
Bipolar	±10V	±5	±2.5	±1.25	±0.625
Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Absolute Accuracy (% of FSR)	0.0075	0.0075	0.0075	0.008	0.008

Analog Output

- **Channels** 2
- **Resolution** 16 bits
- **Output Rate** 3 MS/s max.
- **Output Range** Software programmable

Internal Reference	**Unipolar**	0 ~ 5 V 0 ~ 10 V
	Bipolar	-5 V ~ 5 V -10 V ~ 10 V
External Reference		0 ~ +x V @ -x V (-10 ≤ x ≤ 10)

- **Slew Rate** 20 V/μs
- **Driving Capability** 5 mA
- **Operation Mode** Static update, Waveform Generation
- **Accuracy** INLE: ± 4 LSB, DNLE: ± 1 LSB

Digital I/O

- **Channels** 24
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max., Logic 1: 2.0 V min.
- **Output Voltage** Logic 0: 0.8 V max., Logic 1: 2.0 V min.
- **Output Capability** Sink: 15 mA @ 0.8 V, Source: 15 mA @ 2.0 V

Counter

- **Channels** 2
- **Resolution** 32 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Pulse Generation** Yes
- **Timebase Stability** 50 ppm

General

- **Form factor** PCI Express x 1
- **Triggering** 16 bits Analog x 2 / Digital x 2
- **I/O Connector** 68-pin SCSI female connector
- **Dimensions (L x W)** 167 x 100 mm
- **Power Consumption** Typical: 3.3 V @ 488 mA, 12 V @ 112 mA; Max.: 3.3 V @ 2.25 A, 12 V @ 390 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -40 ~ 70°C (-40 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH non-condensing

Ordering Information

- **PCIE-1816** 1 MS/s, 16-bit Multifunction Card
- **PCIE-1816H** 5 MS/s, 16-bit Multifunction Card

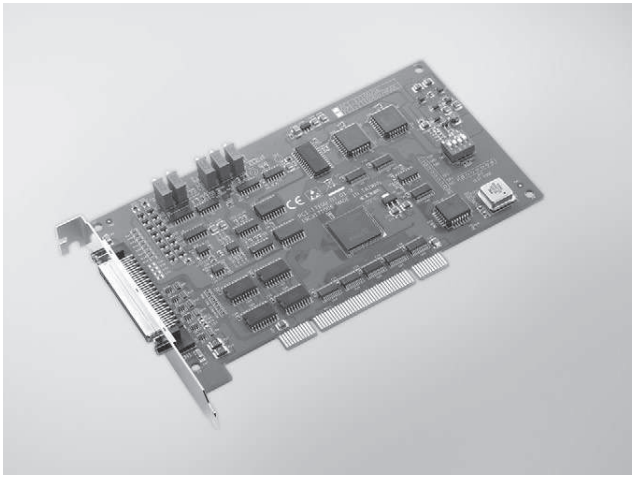
Accessories

- **PCL-10168H-1E** 68-pin SCSI Shielded Cable with Noise Rejecting, 1 m
- **PCL-10168H-2E** 68-pin SCSI Shielded Cable with Noise Rejecting, 2 m
- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

PCI-1710U/UL
PCI-1710HGU

100 kS/s, 12-bit, 16-ch Universal PCI Multifunction DAQ Card

100 kS/s, 12-bit, 16-ch Universal PCI Multifunction DAQ Card with High Gain



FCC CE RoHS COMPLIANT 2002/95/EC

Features

- 16-ch single-ended or 8-ch differential or a combination of analog input
- 12-bit A/D converter, with up to 100 kHz sampling rate
- Programmable gain
- Automatic channel/gain scanning
- Onboard FIFO memory (4,096 samples)
- Two 12-bit analog output channels (PCI-1710U/HGU only)
- 16-ch digital input and 16-ch digital output
- Onboard programmable counter
- BoardID™ switch

Specifications

Analog Input

- **Channels** 16 single-ended/ 8 differential (software programmable)
- **Resolution** 12 bits
- **FIFO Size** 4,096 samples
- **Overvoltage Protection** 30Vp-p
- **Input Impedance** 1 GΩ
- **Sampling Modes** Software, onboard programmable pacer and external
- **Input Range (V, software programmable) & Absolute Accuracy**

PCI-1710U/UL					
Gain	0.5	1	2	4	8
Bipolar	±10	±5	±2.5	±1.25	±0.625
Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Absolute Accuracy (% of FSR)*	0.1	0.1	0.2	0.2	0.4

PCI-1710HGU								
Gain	0.5	1	5	10	50	100	500	1000
Bipolar	±10	±5	±1	±0.5	±0.1	±0.05	±0.01	±0.005
Unipolar	N/A	0 ~ 10	N/A	0 ~ 1	N/A	0 ~ 0.1	N/A	0 ~ 0.01
Absolute Accuracy (% of FSR)*	0.1	0.1	0.2	0.2	0.4	0.4	0.8	0.8

* ±1 LSB is added as the derivative for absolute accuracy

- **Maximum Sampling Rate**

Model	Gain	Max. Sampling Rate
PCI-1710U/UL	0.5, 1, 2, 4, 8	100 kS/s
PCI-1710HGU	0.5, 1	100 kS/s
	5, 10	35 kS/s
	20, 100	7 kS/s
	500, 1000	770 S/s

Note: The sampling rate for each channels will be affected by used channel number. For example, if 4 channels of PCI-1710U are used, the sampling rate is 100k/4 = 25 kS/s per channel.

Analog Output (PCI-1710U/HGU only)

- **Channels** 2
- **Resolution** 12 bits
- **Output Rate** Static update
- **Output Range** (Software programmable)

Internal Reference	Unipolar	0 ~ 5 V 0 ~ 10 V
External Reference		0 ~ +x V @ -x V (-10 ≤ x ≤ 10)

- **Slew Rate** 10 V/μs
- **Driving Capability** 3 mA
- **Operation Mode** Static update
- **Accuracy** INLE: ±1 LSB, DNLE: ±1 LSB

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.4 V max.
Logic 1: 2.4 V min.
- **Output Capability** Sink: 8.0 mA @ 0.8 V
Source: 0.4 mA @ 2.0 V

Pacer/Counter

- **Channels** 1
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 1 MHz

General

- **Bus Type** Universal PCI V2.2
- **I/O Connector** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA
Max.: 5 V @ 1.0 A
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH non-condensing

Ordering Information

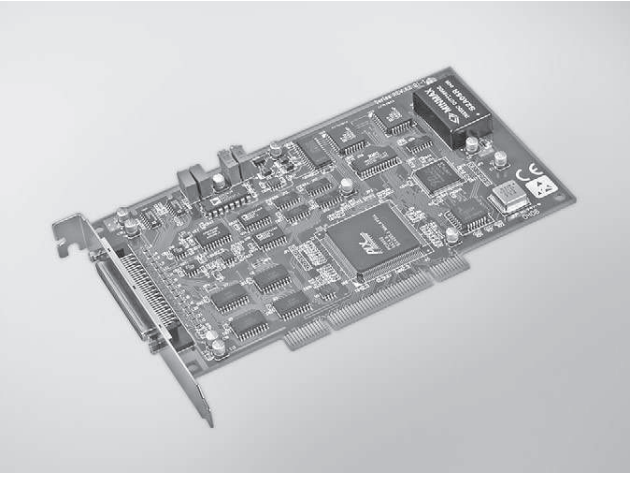
- **PCI-1710U** 100 kS/s, 12-bit Multifunction Card
- **PCI-1710UL** 100 kS/s, 12-bit Multifunction Card w/o AO
- **PCI-1710HGU** 100 kS/s, 12-bit High-gain Multifunction Card

Accessories

- **PCLD-8710** DIN-rail Wiring Board w/ CJC
- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

PCI-1711U/UL

100 kS/s, 12-bit, 16-ch Universal PCI Multifunction DAQ Card



FCC CE RoHS

Features

- 16-ch single-ended analog input
- 12-bit A/D converter, with up to 100 kHz sampling rate
- Programmable gain
- Automatic channel/gain scanning
- Onboard FIFO memory (1,024 samples)
- Two 12-bit analog output channels (PCI-1711U only)
- 16-ch digital input and 16-ch digital output
- Onboard programmable counter

Specifications

Analog Input

- **Channels** 16 single-ended
- **Resolution** 12 bits
- **Max. Sampling Rate** 100 kS/s

Note: The sampling rate for each channels will be affected by used channel number. For example, if 4 channels are used, the sampling rate is 100k/4 = 25 kS/s per channel.

- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 2 MΩ/5 pF
- **Sampling Modes** Software, onboard programmable pacer, or external
- **Input Range (V, software programmable) & Absolute Accuracy**

Bipolar	± 10	± 5	± 2.5	± 1.25	± 0.625
Absolute Accuracy (% of FSR)*	0.1	0.1	0.2	0.2	0.4

* ±1 LSB is added as the derivative for absolute accuracy

Analog Output (PCI-1711U only)

- **Channels** 2
- **Resolution** 12 bits
- **Output Rate** Static update
- **Output Range** (Software programmable)

Internal Reference	Unipolar	0 ~ 5 V, 0 ~ 10 V
External Reference		0 ~ +x V @ -x V (-10 ≤ x ≤ 10)

- **Slew Rate** 11 V/μs
- **Driving Capability** 3 mA
- **Output Impedance** 0.81 Ω
- **Operation Mode** Static update
- **Accuracy** INLE: ±0.5 LSB
  DNLE: ±0.5 LSB

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.8 V
  Logic 1: 2.0 V
- **Output Capability** Sink: 8.0 mA @ 0.8 V
  Source: 0.4 mA @ 2.0 V

Pacer/Counter

- **Channels** 1
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Reference Clock** Internal: 10 MHz

General

- **Bus Type** Universal PCI V2.2
- **I/O Connector** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption**
  PCI-1711U Typical: 5 V @ 850 mA
  Max.: 5 V @ 1.0 A
  PCI-1711UL Typical: 5 V @ 700 mA
  Max.: 5 V @ 1.0 A
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH non-condensing

Ordering Information

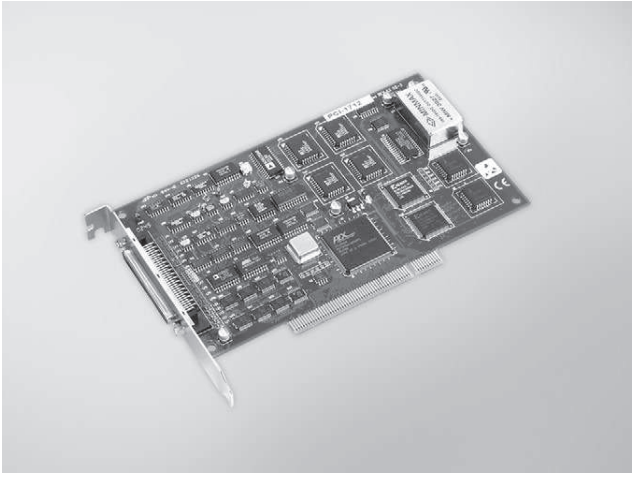
- **PCI-1711U** Entry-level 100 kS/s, 12-bit Multifunction Card
- **PCI-1711UL** Entry-level 100 kS/s, 12-bit Multi. Card w/o AO

Accessories

- **PCLD-8710** DIN-rail Wiring Board w/ CJC
- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

PCI-1712/L

1 MS/s, 12-bit, 16-ch PCI Multifunction DAQ Card



Features

- 16 single-ended or 8 differential or a combination of analog inputs
- 12-bit A/D converter, with up to 1 MHz sampling rate
- Programmable gain
- Automatic channel/gain scanning
- Onboard FIFO memory (AI: 1,024 samples AO: 32,768 samples)
- Two 12-bit analog output channels with continuous waveform output function (PCI-1712 only)
- 16-ch digital input and 16-ch digital output
- Three 16-bit programmable multifunction counter/timers on 10 MHz
- Auto-calibration (AI/AO)
- PCI-Bus mastering data transfer
- Pre-, post-, about- and delay-trigger data acquisition modes for analog input channels
- Flexible triggering and clocking capabilities

Specifications

Analog Input

- **Channels** 16 single-ended/ 8 differential (software programmable)
- **Resolution** 12 bits
- **Max. Sampling Rate** Multi-channel, single gain: 1 MS/s
  Multi-channel, multi gain: 600 kS/s
  Multi-channel, multi gain, unipolar/bipolar: 400 kS/s
- **FIFO Size** 1,024 samples

Note: The sampling rate for each channels will be affected by used channel number. For example, if 4 channels are used, the sampling rate is 600k/4 = 125 kS/s per channel. (multi gain, without unipolar/bipolar mixed)

- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 100 MΩ/10 pF (Off), 100 MΩ/100 pF (On)
- **Sampling Modes** Software, onboard programmable pacer and external
- **Trigger Modes** Pre-trigger, post-trigger, delay-trigger and about-trigger
- **Input Range (V, software programmable) & Absolute Accuracy**

Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625
Absolute Accuracy (% of FSR)*	0.1	0.1	0.2	0.2	0.4

* ±1 LSB is added as the derivative for absolute accuracy

Analog Output (PCI-1712 only)

- **Channels** 2
- **Resolution** 12 bits
- **Output Rate** 1 MS/s max.
- **FIFO Size** 32,768 samples
- **Output Range** (Software programmable)

Internal Reference	**Bipolar**	±5 V, ±10 V
	Unipolar	0 ~ 5 V, 0 ~ 10 V
External Reference		0 ~ +x V @ +x V (-10 ≤ x ≤ 10) -x ~ +x V @ +x V (-10 ≤ x ≤ 10)

- **Slew Rate** 20 V/μs
- **Driving Capability** 10 mA
- **Output Impedance** 0.1 Ω max.
- **Operation Mode** Static update, waveform generation
- **Accuracy** INLE: ±1 LSB
  DNLE: ±1 LSB

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Capability** Sink: 8.0 mA @ 0.8 V
  Source: 0.4 mA @ 2.0 V

Pacer/Counter

- **Channels** 3
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Reference Clock** Internal: 10 MHz, 1 MHz, 100 kHz, 10 kHz
  External Frequency: 10 MHz max.

General

- **Bus Type** PCI V 2.2
- **I/O Connector** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA, 12 V @ 600 mA
  Max.: 5 V @ 1.0 A, 12 V @ 700 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 85°C (-4 ~ 185°F)
- **Storage Humidity** 5 ~ 95% RH non-condensing

Ordering Information

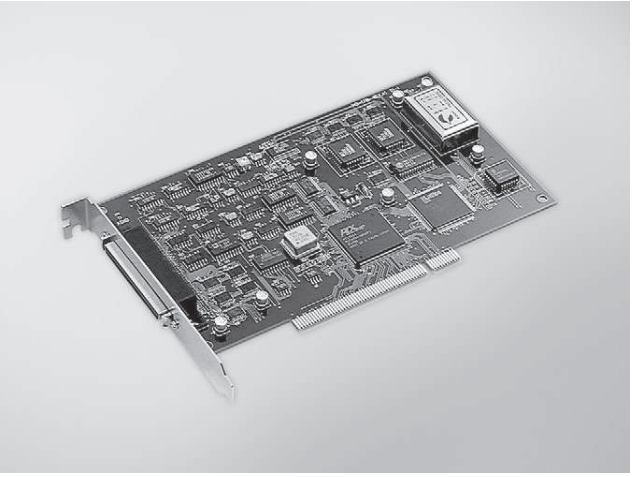
- **PCI-1712** 1 MS/s, 12-bit High-speed Multifunction PCI Card
- **PCI-1712L** 1 MS/s, 12-bit High-speed Multi. PCI Card w/o AO

Accessories

- **PCLD-8712** DIN-rail Wiring Board for PCI-1712/L
- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

PCI-1716/L

250 kS/s, 16-bit, 16-ch PCI Multifunction DAQ Card



Features

- 16 single-ended or 8 differential or a combination of analog inputs
- 16-bit A/D converter, with up to 250 kHz sampling rate
- Onboard FIFO memory (1,024 samples)
- Auto-calibration
- PCI-Bus mastering data transfer
- 2 analog output channels (PCI-1716 only)
- 16-ch digital input and 16-ch digital output
- Onboard programmable counter
- BoardID switch

Specifications

Analog Input

- **Channels** 16 single-ended/ 8 differential (software programmable)
- **Resolution** 16 bits
- **Max. Sampling Rate** 250 kS/s

Note: The sampling rate for each channels will be affected by used channel number. For example, if 4 channels are used, the sampling rate is 250k/4 = 62.5 kS/s per channel.

- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 100 MΩ/10 pF (off), 100 MΩ/100 pF (on)
- **Sampling Modes** Software, onboard programmable pacer and external
- **Input Range (V, software programmable) & Absolute Accuracy**

Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625
Absolute Accuracy (% of FSR)*	0.05	0.03	0.03	0.05	0.1

* ±1 LSB is added as the derivative for absolute accuracy

Analog Output (PCI-1716 only)

- **Channels** 2
- **Resolution** 16 bits
- **Output Rate** Static update
- **Output Range** (Software programmable)

Internal Reference	**Unipolar**	0 ~ 5 V , 0 ~ 10 V
	Bipolar	±5 V, ±10 V
External Reference	0 ~ +x V @ +x V (-10 ≤ x ≤ 10) -x ~ +x V @ +x V (-10 ≤ x ≤ 10)	

- **Slew Rate** 20 V/μs
- **Driving Capability** 20 mA
- **Output Impedance** 0.1 Ω max.
- **Operation Mode** Static update
- **Accuracy** INLE: ±1 LSB

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.4 V max.
Logic 1: 2.4 V min.
- **Output Capability** Sink: 0.8 mA @ 0.8 V
Source: 2.4 mA @ 2.0 V

Pacer/Counter

- **Channels** 1
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 1 MHz
- **Reference Clock** Internal: 10 MHz
External Clock Frequency: 10 MHz max.

General

- **Bus Type** PCI V2.2
- **I/O Connector** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA, 12 V @ 600 mA
Max.: 5 V @ 1 A, 12 V @ 700 mA
- **Operating Temperature** 0 ~ 70°C (32 ~ 158°F)
- **Storage Temperature** -20 ~ 85°C (-4 ~ 185°F)
- **Operating Humidity** 5 ~ 85% RH non-condensing
- **Storage Humidity** 5 ~ 95% RH non-condensing

Ordering Information

- **PCI-1716** 250 kS/s, 16-bit High-resolution Multi. Card
- **PCI-1716L** 250 kS/s, 16-bit High-res. Multi. Card w/o AO

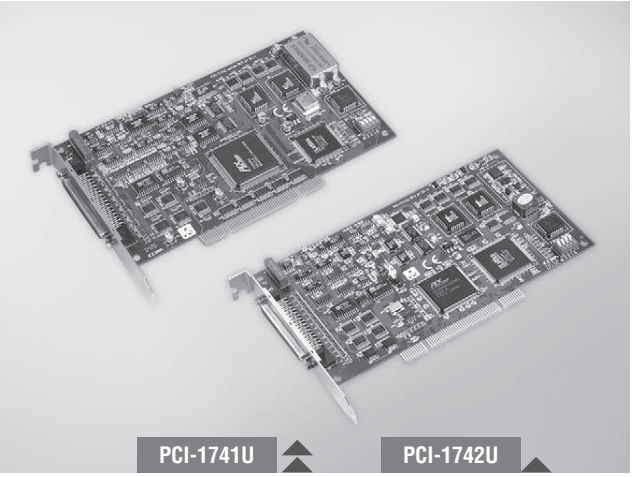
Accessories

- **PCLD-8710** DIN-rail Wiring Board w/ CJC
- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

PCI-1741U
PCI-1742U

200 kS/s, 16-bit, 16-ch Universal PCI Multifunction DAQ Card

1 MS/s, 16-bit, 16-ch Universal PCI Multifunction DAQ Card



FCC CE RoHS COMPLIANT 2002/95/EC

Features

- 16-ch single-ended or 8-ch differential analog input
- 16-bit A/D converter, with up to 200 kHz sampling rate for PCI-1741U and 1 MHz sampling rate for PCI-1742U
- Onboard FIFO memory (1,024 samples)
- Auto calibration
- PCI-1741U: 1 x 16-bit analog output channel
  PCI-1742U: 2 x 16-bit analog output channels
- 16-ch digital input and 16-ch digital output
- Universal PCI bus (support 3.3 V or 5 V PCI bus signal)
- Onboard programmable counter
- BoardID switch

Specifications

Analog Input

- **Channels** 16 single-ended/8 differential (software programmable)
- **Resolution** 16 bits
- **Max. Sampling Rate** PCI-1741U: 200 kS/s
  PCI-1742U: Single-channel: 1 MS/s
  All unipolar or bipolar: 800 kS/s
  Unipolar and bipolar mixed: 250 kS/s

Note: The sampling rate for each channels will be affected by used channel number. For example, if 4 channels of PCI-1742U are used, the sampling rate is 800k/4 = 200 kS/s per channel (without unipolar and bipolar mixed).

- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 100 MΩ/10pF (Off); 100 MΩ/100pF (On)
- **Sampling Mode** Software, onboard programmable pacer and external
- **Input Range* (V, software programmable) & Absolute Accuracy**

Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625
Absolute Accuracy (% of FSR)**	0.02	0.02	0.02	0.03	0.04

* All channels should be set to the same range
** ±1 LSB is added as the derivative for absolute accuracy

Analog Output

- **Channels** PCI-1741U: 1
  PCI-1742U: 2
- **Resolution** 16 bits
- **Output Rate** Static update
- **Output Range** (Software programmable)

Internal Reference	**Bipolar**	±5 V, ±10 V
	Unipolar	0 ~ 5 V, 0 ~ 10 V
External Reference		0 ~ +xV @ +xV (-10 ≤ x ≤ 10) -x ~ +xV @ +xV (-10 ≤ x ≤ 10)

- **Slew Rate** PCI-1741U: 20 V/us
  PCI-1742U: 40 V/us
- **Driving Capability** ±20 mA
- **Output Impedance** 0.1 Ω max.
- **Operation Mode** Static update
- **Accuracy** INLE: ±2 LSB

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Capability** Sink: 24 mA @ 0.8 V
  Source: 15 mA @ 2.0 V

Counter/Timer

- **Channels** 1
- **Compatibility** 5 V/TTL
- **Resolution** 16 bits
- **Max. Input Frequency** 10 MHz
- **Reference Clock** Internal: 10 MHz
  External Clock Frequency: 10 MHz

General

- **Bus Type** Universal PCI V2.2
- **I/O Connector Type** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA, 12 V @ 600 mA
  Max.: 5 V @ 1 A, 12 V @ 700 m A
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

- **PCI-1741U** 200 kS/s, 16-bit, 16-ch Univ. PCI Multi. Card
- **PCI-1742U** 1 MS/s, 16-bit, 16-ch Univ. PCI Multi. Card

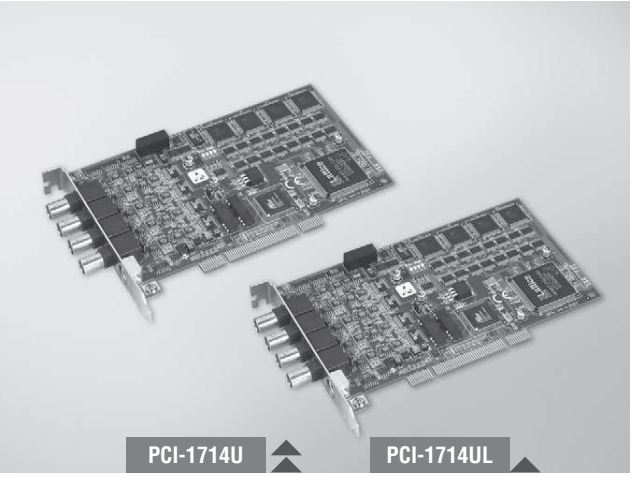
Accessories

- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board
- **PCLD-8710** DIN-rail Wiring Board w/ CJC

PCI-1714U
PCI-1714UL

30 MS/s, 12-bit, Simultaneous 4-ch Analog Input Universal PCI Card

10 MS/s, 12-bit, Simultaneous 4-ch Analog Input Universal PCI Card



FCC CE RoHS COMPLIANT 2002/95/EC

Features

- 4 single-ended analog input channels
- 12-bit A/D converter, with up to 30 MHz sampling rate
- Programmable gain
- Onboard FIFO memory (PCI-1714U: 32,768 samples each channel; PCI-1714UL: 8,192 samples, each channel)
- 4 A/D converters simultaneously sampling
- Multiple A/D triggering modes
- Programmable pacer/counter
- BoardID™ switch
- Universal PCI Bus (supports 3.3 V or 5 V PCI bus signals)

Introduction

PCI-1714U and PCI-1714UL are advanced high-performance data acquisition cards based on the PCI bus. With a large FIFO of 32,768 for each channel, the maximum sampling rate of PCI-1714U can get up to 30 MS/s, on each channel, with an emphasis on continuous, non-stop, high-speed, streaming data of samples to host memory. The low-cost PCI-1714UL offers 10 MS/s on each channel at a stable rate, and has also been equipped with a universal PCI interface.

Specifications

Analog Input

- **Channels** 4 single-ended
- **Resolution** 12 bits
- **Max. Sampling Rate** PCI-1741U: 30 MS/s per channel
  PCI-1741UL: 10 MS/s per channel
- **FIFO Size** PCI-1714U: 32,768 samples each channel
  PCI-1714UL: 8,192 samples each channel
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 50 Ω/1 MΩ/Hi Z jumper selectable/100 pF
- **Sampling Modes** Software polling, pacer
- **Trigger Modes** Post-trigger, pre-trigger, delay-trigger, about-trigger
- **Input Range (V, software programmable) & Absolute Accuracy**

Bipolar	±5	±2.5	±1	±0.5
Absolute Accuracy (% of FSR)*	0.1	0.2	0.2	0.4

* ±1 LSB is added as the derivative for absolute accuracy

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 4 x BNC connector (for AI)
  1 x PS/2 connector (for Ext. clock and trigger)
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA ; 12 V @ 600 mA
  Max.: 5 V @ 1 A; 12 V @ 700m A
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 85°C (-4 ~ 185°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

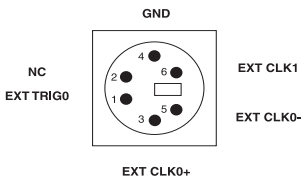
Ordering Information

- **PCI-1714U** 30 MS/s, 12-bit, Simultaneous 4-ch AI PCI Card
- **PCI-1714UL** 10 MS/s, 12-bit, Simultaneous 4-ch AI PCI Card

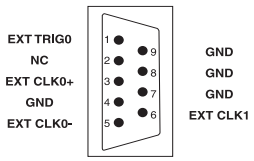
Accessories

- **ADAM-3909** DB9 DIN-rail Wiring Board
- **PCL-1010B-1E** BNC to BNC Wiring Cable, 1 m
- **PCL-10901-1E** DB9 to PS/2 Cable, 1 m
- **PCL-10901-3E** DB9 to PS/2 Cable, 3 m

Pin Assignments



Onboard PS/2 Connector

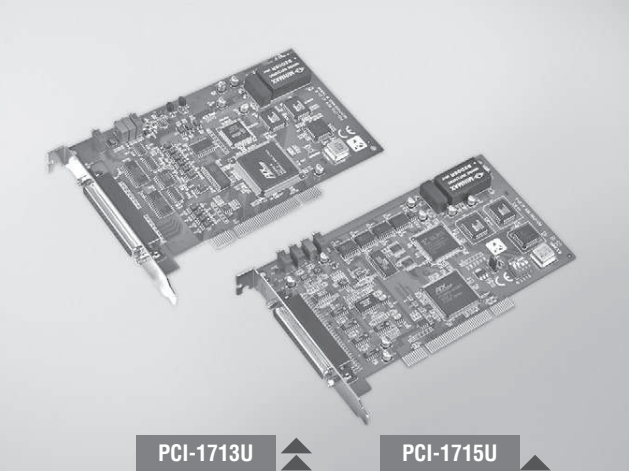


PS/2 To DB9 Cable Connector

PCI-1713U
PCI-1715U

100 kS/s, 12-bit, 32-ch Isolated Analog Input Universal PCI Card

500 kS/s, 12-bit, 32-ch Isolated Analog Input Universal PCI Card



Features

- 2,500 V_{DC} isolation protection
- 32-ch single-ended or 16-ch differential or a combination of analog input
- 12-bit resolution for A/D conversion
- Programmable gain for each input channel
- Onboard FIFO memory (PCI-1713U: 4,096 samples; PCI-1715U: 1,024 samples)
- Software, internal or external pacer sampling modes supported
- Universal PCI bus
- BoardID™ switch

Specifications

Analog Input

- **Channels** 32 single-ended/16 differential (software programmable)
- **Resolution** 12 bits
- **Max. Sampling Rate** PCI-1713U: 100 kS/s
  PCI-1715U: 500 kS/s

Note: The sampling rate for each channels will be affected by used channel number. For example, if 4 channels of PCI-1713U are used, the sampling rate is 100k/4 = 25 kS/s per channel.

- **FIFO Size** PCI-1713U: 4,096 samples
  PCI-1715U: 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Isolation Protection** 2,500 V_{DC}
- **Input Impedance** 1 GΩ
- **Sampling Modes** Software, onboard programmable pacer and external clock (TTL level)
- **Input Range (V, software programmable) & Absolute Accuracy**

Unipolar	N/A	0 ~10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625
Absolute Accuracy (% of FSR)*	0.1	0.1	0.2	0.2	0.4

* ±1 LSB is added as the derivative for absolute accuracy

General

- **Bus Type** Universal PCI V2.2
- **I/O Connector** 1 x DB37 female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA
  Max.: 5 V @ 1.0 A
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH non-condensing

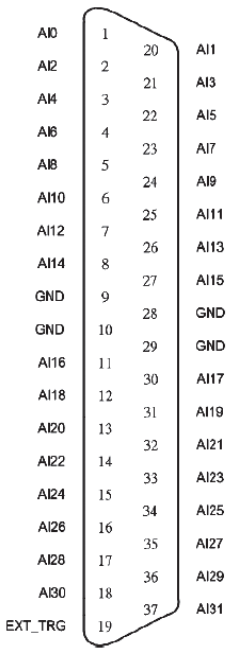
Ordering Information

- **PCI-1713U** 100 kS/s, 12-bit, 32-ch Isolated AI PCI Card
- **PCI-1715U** 500 kS/s, 12-bit, 32-ch Isolated AI PCI Card

Accessories

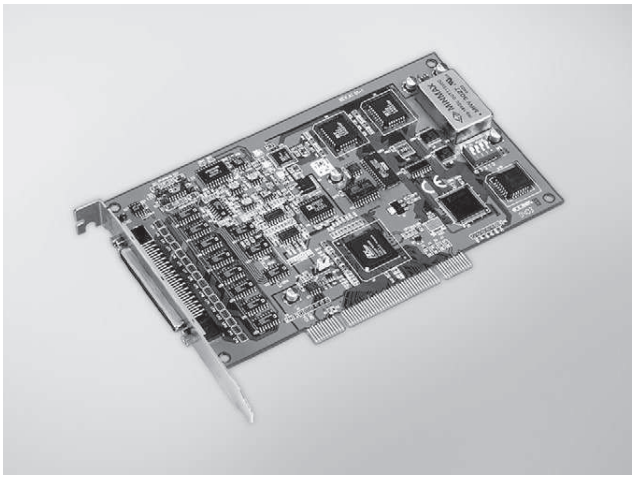
- **ADAM-3937** DB37 DIN-rail Wiring Board
- **PCL-10137-1E** DB37 Cable, 1 m
- **PCL-10137-2E** DB37 Cable, 2 m
- **PCL-10137-3E** DB37 Cable, 3 m

Pin Assignments



PCI-1747U

250 kS/s, 16-bit, 64-ch Analog Input Universal PCI Card



Features

- 64-ch single-ended or 32-ch differential or a combination of analog input
- 16-bit A/D converter, with up to 250 kHz sampling rate
- Auto calibration
- Onboard FIFO memory (1,024 samples)
- PCI-Bus mastering data transfer
- Universal PCI Bus (support 3.3 V or 5 V PCI bus signal)
- BoardID™ switch

Introduction

PCI-1747U is a high-resolution, high-channel-count analog input card for the PCI bus. Its sampling rate is up to 250 kS/s and 16-bit resolution provides the resolution needed for most data acquisition applications. PCI-1747U provides 64 single-ended, 32 differential analog input channels or a combination of these. It also has a built in 1,024 FIFO buffer for analog input data.

Specifications

Analog Input

- **Channels** 64 single-ended, 32 differential, or combination
- **Resolution** 16 bits
- **Max. Sampling Rate** 250 kS/s

Note: The sampling rate for each channels will be affected by used channel number. For example, if 4 channels are used, the sampling rate is 250k/4 = 62.5 kS/s per channel.

- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 100 MΩ/10 pF (Off); 100 MΩ/100 pF (On)
- **Sampling Modes** Software and onboard programmable pacer
- **Input Range (V, software programmable) & Absolute Accuracy**

Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625
Absolute Accuracy (% of FSR)*	0.03	0.02	0.02	0.03	0.04

* ±1 LSB is added as the derivative for absolute accuracy

General

- **Bus Type** Universal PCI V2.2
- **I/O Connector** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA, 12 V @ 600 mA
  Max.: 5 V @ 1 A, 12 V @ 700 m A
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

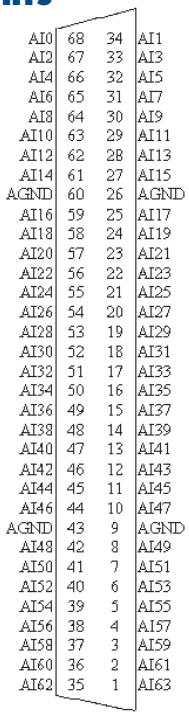
Ordering Information

- **PCI-1747U** 250 kS/s, 16-bit, 64-ch AI Universal PCI Card

Accessories

- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board
- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m

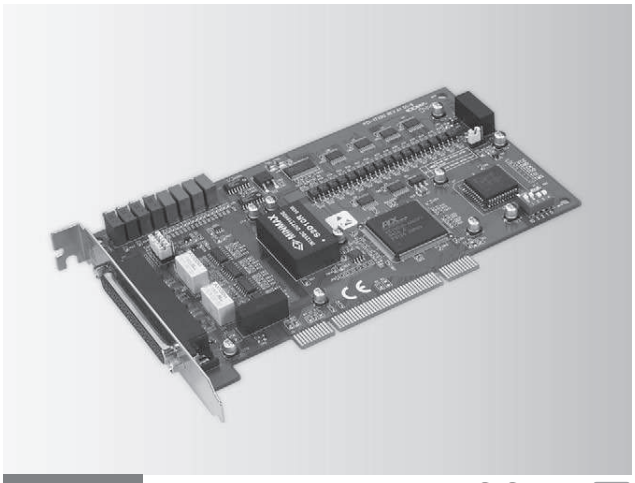
Pin Assignments



PCI-1720U
PCI-1724U

12-bit, 4-ch Isolated Analog Output Universal PCI Card

14-bit, 32-ch Isolated Analog Output Universal PCI Card



PCI-1720U

FCC CE RoHS

Specifications

Analog Output

- **Channels** 4 isolated
- **Resolution** 12 bits
- **Output Rate** Static update
- **Output Range**

Bipolar (V)	±5, ±10
Unipolar (V)	0 ~ 5, 0 ~ 10
Current Loop (mA)	0 ~ 20, 4 ~ 20 (software programmable)

- **Slew Rate** 2 V/μs
- **Isolation Protection** 2,500 V_{DC}
- **Driving Capability** 5 mA
- **Operation Modes** Software polling
- **Accuracy** Relative: ±1 LSB; Differential Non-Linearity: ±1 LSB (monotonic)
- **Excitation Voltage** 50 V (max.)

General

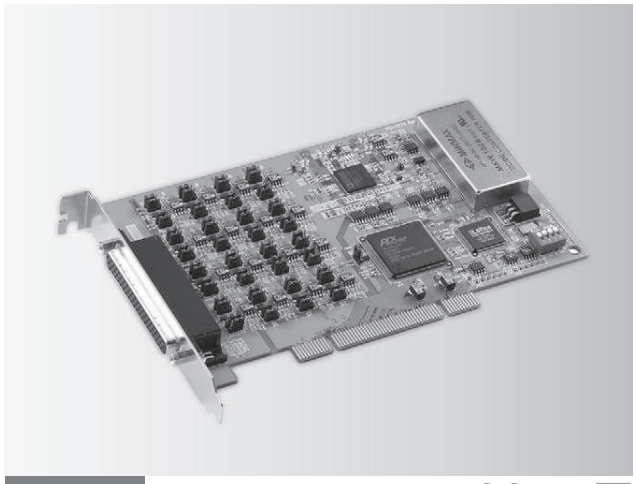
- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x DB37 female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** 5 V @ 350 mA (typical), 500 mA (max.) 12 V @ 200 mA (typical), 350 mA (max.)
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

- **PCI-1720U** 12-bit, 4-ch Isolated AO Universal PCI Card

Accessories

- **PCL-10137-1E** DB37 Cable, 1 m
- **PCL-10137-2E** DB37 Cable, 2 m
- **PCL-10137-3E** DB37 Cable, 3 m
- **ADAM-3937** DB37 DIN-rail Wiring Board



PCI-1724U

FCC CE RoHS

Specifications

Analog Output

- **Channels** 32 isolated
- **Resolution** 14 bits
- **Output Rate** Static update
- **Output Range**

Bipolar (V)	±10
Current Loop (mA)	0 ~ 20, 4 ~ 20 (software programmable)

- **Isolation Protection** 1,500 V_{DC} system isolation
- **Output Impedance** 0.1 Ω max.
- **Operation Modes** Software polling, synchronized output
- **Accuracy** Relative: ±4 LSB Differential Non-linearity: ±2 LSB (monotonic)
- **Driving Capacity** 10 mA

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x DB62 female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption 5** V @ 400 mA, 12 V @ 270 mA max.
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95 % RH, non-condensing

Ordering Information

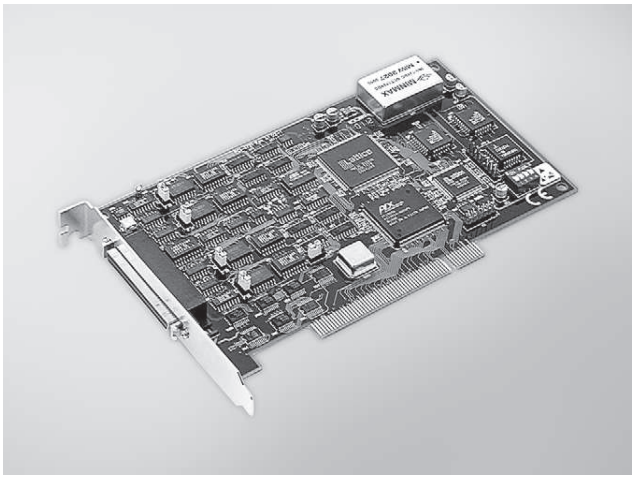
- **PCI-1724U** 14-bit, 32-ch Isolated AO Universal PCI Card

Accessories

- **PCL-10162-1E** DB62 Cable, 1 m
- **PCL-10162-3E** DB62 Cable, 3 m
- **ADAM-3962** DB62 DIN-rail Wiring Board

PCI-1721

12-bit, 4-ch Analog Output PCI Card with 16-ch Digital I/O



Features

- 10 MHz maximum digital update rate
- Auto calibration function
- Four analog output channels with 1,024 samples FIFO buffer
- A 12-bit DAC is equipped for each of analog output channels
- Real-time waveform output function with internal/external pacer
- Synchronized output function
- Flexible output types and range settings
- Keeps the output settings and values after system hot reset
- 16-ch DI/O and one 10 MHz 16-bit resolution counter
- BoardID™ switch

Introduction

PCI-1721 is an advanced high-speed analog output card for the PCI bus, and each of analog output channels are equipped with a 12-bit, double-buffered DAC. It features many powerful and unique functions, like a waveform output function with 10 MHz maximum update rate, auto-calibration and a BoardID switch. PCI-1721 is an ideal solution for industrial applications where high-speed continuous analog output or real-time waveform output functions are required.

Specifications

Analog Output

- **Channels** 4
- **Resolution** 12 bits
- **FIFO Size** 1,024 samples
- **Output Rate** 10 MHz or static update
- **Reference Clock** Internal: 10 MHz
  External Clock Frequency: 10 MHz max.
  External Voltage Range: 0.8 V max., 2 V min.
- **Output Range**

Internal Reference	**Unipolar**	0 ~ 5 V, 0 ~ 10 V,
	Bipolar	±5 V, ±10 V
	Current Loop	0 ~ 20 mA, 4 ~ 20 mA (software programmable)
External Reference		0 ~ +x V @ +x V (-10 ≤ x ≤ 10) -x ~ +x V @ +x V (-10 ≤ x ≤ 10)

- **Slew Rate** 10 V/μs
- **Driving Capability** 10 mA
- **Output Impedance** 0.1 Ω max.
- **Operation Modes** Single/continuous/waveform/synchronized output
- **Accuracy** Relative: ±1 LSB
  Differential Non-linearity: ±1 LSB (monotonic)

Digital Input/Output

- **Channels** 16 (shared by input/output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Capability** Sink: 0.5 V @ 24 mA
  Source: 2.0 V @ -15 mA

Counter/Timer

- **Channels** 1
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Reference Clock** Internal: 10 MHz
  External Clock Frequency: 10 MHz max.
  External Voltage Range: 0.8 V max, 2.0 V min.

General

- **Bus Type** PCI V2.2
- **I/O Connectors** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA, 12 V @ 600 mA
  Max.: 5 V @ 1 A, 12 V @ 700 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 85°C (-4 ~ 185°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

- **PCI-1721** 12-bit, 4-ch Advanced PCI Analog Output Card

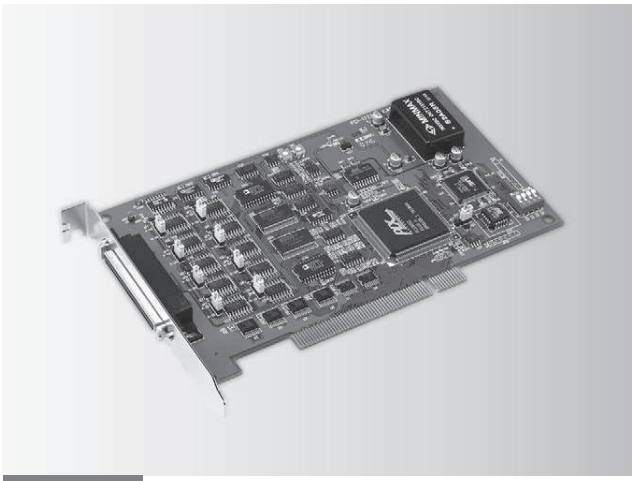
Accessories

- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

PCI-1723
PCI-1727U

16-bit, 8-ch Analog Output PCI Card with 16-ch Digital I/O

14-bit, 12-ch Analog Output Universal PCI Card with 32-ch Digital I/O



PCI-1723

FCC CE RoHS

Specifications

Analog Output

- **Channels** 8
- **Resolution** 16 bits
- **Output Rate** Static update
- **Output Range**

Bipolar (V)	±10
Current Loop (mA)	0 ~ 20, 4 ~ 20 (software programmable)

- **Driving Capability** 5 mA
- **Output Impedance** 0.1 Ω max.
- **Operation Modes** Software polling, synchronized output
- **Accuracy** Relative: ±6 LSB
  Differential Non-linearity: ±6 LSB (monotonic)

Digital Input/Output

- **Channels** 16 (shared by input/output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Capability Sink** Sink: 0.5 V @ 24 mA
  Source: 2.0 V @ 15 mA

General

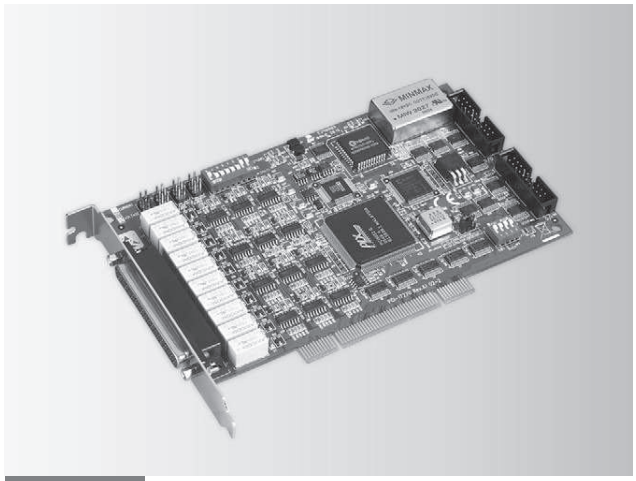
- **Bus Type** PCI V2.2
- **I/O Connectors** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA, 12 V @ 600 mA
  Max.: 5 V @ 1 A, 12 V @ 700 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 158°F)
- **Storage Temperature** -20 ~ 85°C (-4 ~ 185°F)
- **Storage Humidity** 5 ~ 95% RH non-condensing

Ordering Information

- **PCI-1723** 16-bit, 8-ch Non-isolated Analog Output PCI Card

Accessories

- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board



PCI-1727U

FCC CE RoHS

Specifications

Analog Output

- **Channels** 12
- **Resolution** 14 bits
- **Output Rate** Static update
- **Output Range**

Bipolar (V)	±5
Unipolar (V)	0 ~ 5, 0 ~ 10
Current Loop (mA)	0 ~ 20

- **Slew Rate** 0.7 V/μs
- **Driving Capability** 15 mA
- **Operation Modes** Software polling, synchronized output
- **Current Loop Excitation** 8 ~ 36 V

Digital Input

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Input Loading** 0.5 V @ 0.4 mA max. (low)
  2.7 V @ 50 μA max. (high)

Digital Output

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.5 V, Logic 1: 2.4 V
- **Output Capability** Sink: 0.5 V @ 8 mA
  Source: 2.4 V @ 0.4 mA

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x 37-pin D-type female connector
  2 x 20-pin box header
- **Power Consumption** 5 V @ 460 mA typical, 500 mA max
  12 V @ 150 mA typical,100 mA max
- **Dimensions (L x H)** 175 × 100 mm (6.9" ×3.9")
- **Operating Temperature** 0 ~ 50°C (32 ~ 122°F)
- **Storing Temperature** -20 ~ 65°C (-4 ~ 149°F)
- **Storing Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

- **PCI-1727U** 14-bit, 12-ch Universal Analog Output Card

Accessories

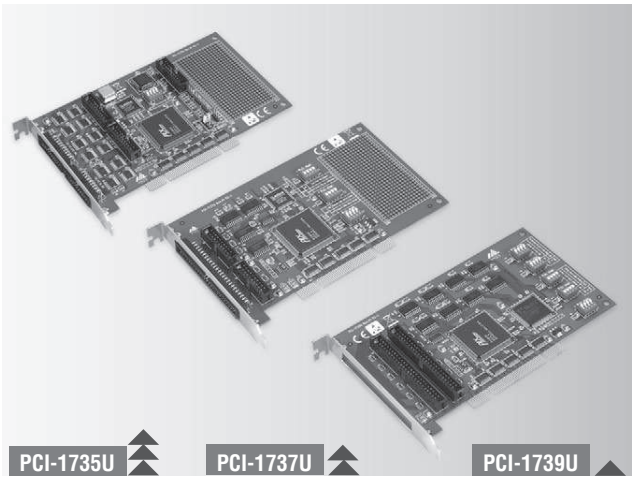
- **PCL-10120-1E** 20-pin flat cable, 1 m
- **PCL-10137-1E** DB37 cable assembly, 1 m
- **ADAM-3937** DB37 wiring terminal for DIN-rail mounting

PCI-1735U
PCI-1737U
PCI-1739U

64-ch Digital I/O and Counter Universal PCI Card

24-ch Digital I/O Universal PCI Card

48-ch Digital I/O Universal PCI Card



Features

- ISA-Compatible with PCL-720+ (PCI-1735U), PCL-724 (PCI-1737U) and PCL-731 (PCI-1739U)
- TTL-level digital input and output compatibility
- Emulates mode 0 of 8255 PPI (PCI-1737U and PCI-1739U)
- Interrupt handling capability (PCI-1737U and PCI-1739U)
- Output status readback (PCI-1737U and PCI-1739U)
- 3 programmable counter/timer channels and User configurable clock source (PCI-1735U)
- Breadboard area for custom circuits (PCI-1735U and PCI-1739U)
- PCI universal card

Specifications

Digital Input

- **Channels**: PCI-1735U: 32
PCI-1737U: 24 (shared with output)
PCI-1739U: 48 (shared with output)
- **Compatibility**: 5 V/TTL
- **Input Voltage**: Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Interrupt Capable Ch.**: PCI-1737U: 1
PCI-1739U: 2

Digital Output

- **Channels**: PCI-1735U: 32
PCI-1737U: 24 (shared with input)
PCI-1739U: 48 (shared with input)
- **Compatibility**: 5 V/TTL
- **Output Voltage**: PCI-1735U: Logic 0: 0.5 V max., Logic 1: 2.0 V min.
PCI-1737U/1739U: Logic 0: 0.4 V max., Logic 1: 2.4 V min.
- **Output Capability**: PCI-1735U: Sink: 0.5 V @ 24 mA, Source: 2.0 V @ 15 mA
PCI-1737U/1739U: Sink: 0.4 V @ 24 mA, Source: 2.4 V @ 15 mA

Counter/Timer (PCI-1735U)

- **Channels**: 3
- **Resolution**: 16 bits
- **Compatibility**: 5 V/TTL
- **Max. Input Frequency**: 1 MHz
- **Re. Clock Internal**: Selectable 1 MHz, 100 kHz, or 10 kHz base clock
- **Ext. Clock Frequency**: Jumper selectable divider: x2, x1, x0.5, and x0.25
- **Prog.Counter Modes**: 6

General

- **Bus Type**: Universal PCI V2.2
- **I/O Connectors**: PCI-1735U: 5 x 20-pin box header
PCI-1737U: 2 x 20-pin & 1 x 50-pin box header
PCI-1739U: 2 x 50-pin box header
- **Dimensions (L x H)**: 175 x 100 mm (6.9" x 3.9")
- **Power Consumption**: PCI-1735U: 5 V @ 98.8 mA (max.)
PCI-1737U: 5 V @ 294.9 mA (max.)
PCI-1739U: 5 V @ 540.8 mA (max.)
- **Operating Temperature**: 0 ~ 65°C (32 ~ 149°F)
- **Storage Temperature**: -25 ~ 80°C (-13 ~ 176°F)
- **Storage Humidity**: 5 ~ 95% RH, non-condensing

Ordering Information

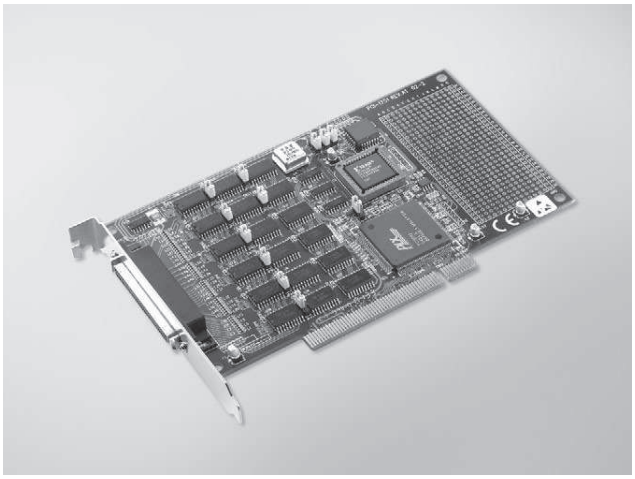
- **PCI-1735U**: 64-ch Digital I/O and Counter Card
- **PCI-1737U**: 24-ch Digital I/O Universal PCI Card
- **PCI-1739U**: 48-ch Digital I/O Universal PCI Card

Accessories

- **PCL-10120-1E**: IDC-20 Flat Cable, 1 m
- **PCL-10120-2E**: IDC-20 Flat Cable, 2 m
- **PCL-10150-1.2E**: 50-pin Flat Cable, 1.2 m
- **ADAM-3920**: 20-Pin Flat Cable Terminal, DIN-rail Mount
- **ADAM-3950**: 50-pin DIN-rail Flat Cable Wiring Board

PCI-1751

48-ch Digital I/O and 3-ch Counter PCI Card



Features

- 48 TTL digital I/O lines
- Emulates mode 0 of 8255 PPI
- Buffered circuits for higher driving capacity than the 8255
- Interrupt handling capability
- Timer/Counter interrupt capability
- Supports both dry and wet contact
- Keeps the I/O port setting and DO state after system reset
- BoardID switch

Introduction

PCI-1751 is a 48-bit digital I/O card for the PCI bus. Its 48 bits are divided into six 8-bit I/O ports and users can configure each port as input or output via software. PCI-1751 also provides one event counter and two 16-bit timers, which can be cascaded to become a 32-bit timer.

Specifications

Digital Input

- **Channels** 48 (shared with output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2 V min.
- **Interrupt Capable Ch.** 4

Digital Output

- **Channels** 48 (shared with input)
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.4 V max.
  Logic 1: 2.4 V min.
- **Output Capability** Sink: 0.4 V @ 24 mA
  Source: 2.4 V @ 15 mA

Counter/Timer

- **Channels** 3
- **Resolution** 2 x 16-bit counters, or 1 x 32-bit counter (jumper selectable)
  1 x 16-bit event counter
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Reference Clock** Internal: 10 MHz
  External Clock Frequency: 10 MHz
  External Voltage Range: 5 V/TTL

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA
  Max.: 5 V @ 1.0 A
- **Operating Temperature** 0 ~ 70°C (32 ~ 158°F)
- **Storage Temperature** -20 ~ 80°C (-4 ~ 176°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

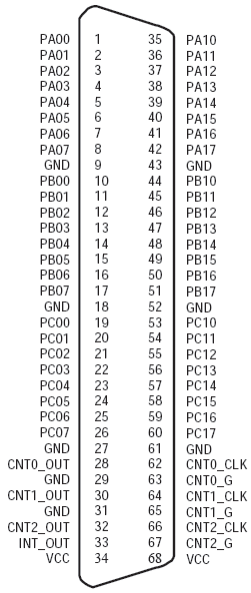
Ordering Information

- **PCI-1751** 48-ch Digital I/O and Counter PCI Card

Accessories

- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board
- **ADAM-3968/20** 68-pin SCSI to 3 20-pin Box Header Board
- **ADAM-3968/50** 68-pin SCSI to 2 50-pin Box Header Board
- **PCLD-8751** 48-ch Isolated Digital Input Board
- **PCLD-8761** 24-ch Replay/ Isolated Digital Input Board
- **PCLD-8762** 48-ch Relay Board

Pin Assignments

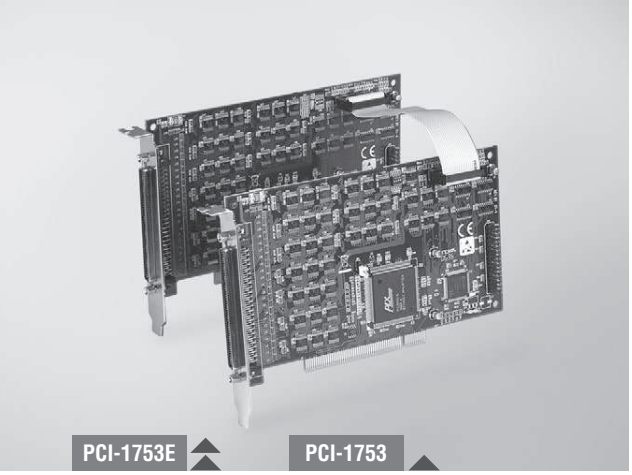


PA00	1	35	PA10
PA01	2	36	PA11
PA02	3	37	PA12
PA03	4	38	PA13
PA04	5	39	PA14
PA05	6	40	PA15
PA06	7	41	PA16
PA07	8	42	PA17
GND	9	43	GND
PB00	10	44	PB10
PB01	11	45	PB11
PB02	12	46	PB12
PB03	13	47	PB13
PB04	14	48	PB14
PB05	15	49	PB15
PB06	16	50	PB16
PB07	17	51	PB17
GND	18	52	GND
PC00	19	53	PC10
PC01	20	54	PC11
PC02	21	55	PC12
PC03	22	56	PC13
PC04	23	57	PC14
PC05	24	58	PC15
PC06	25	59	PC16
PC07	26	60	PC17
GND	27	61	GND
CNT0_OUT	28	62	CNT0_CLK
GND	29	63	CNT0_G
CNT1_OUT	30	64	CNT1_CLK
GND	31	65	CNT1_G
CNT2_OUT	32	66	CNT2_CLK
INT_OUT	33	67	CNT2_G
VCC	34	68	VCC

PCI-1753
PCI-1753E

96-ch Digital I/O PCI Card

96-ch Digital I/O Extension Card for PCI-1753



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Features

- Up to 96 TTL digital I/O lines
- Emulates mode 0 of 8255 PPI
- Buffered circuits for higher driving capacity than the 8255
- Multiple-source interrupt handling capability
- Interrupt output pin for simultaneously triggering external devices with the interrupt
- Output status read-back
- "Pattern match" and "Change of state" interrupt functions for critical I/O monitoring
- Keeps the output settings and values after system hot reset
- Supports both dry and wet contact
- High-density 100-pin SCSI connector

Introduction

PCI-1753 is a 96-bit digital I/O card for the PCI bus, which can be extended to 192 digital I/O channels by connecting its extension board - PCI-1753E. The card emulates mode 0 of the 8255 PPI chip, but the buffered circuits offer a higher driving capability than the 8255. The 96 I/O lines are divided into twelve 8-bit I/O ports: A0, B0, C0, A1, B1, C1, A2, B2, C2, A3, B3 and C3. You can configure each port as input or output via software.

Specifications

Digital Input/Output

Channels	96 digital I/O lines for PCI-1753 192 digital I/O lines if extending with PCI-1753E
Programming Mode	8255 PPI mode 0
Compatibility	5 V/TTL
Input Voltage	Logic 0: 0.8 V max. Logic 1: 2.0 V min.
Output Voltage	Logic 0: 0.44 V max. Logic 1: 3.76 V min.
Output Capability	Sink: 0.44 V @ 24 mA Source: 3.76 V @ 24 mA

General

Bus Type	PCI V2.2
I/O Connector	1 x 100-pin SCSI female connector
Dimensions (L x H)	175 x 100 mm (6.9" x 3.9")
Power Consumption	Typical: 5 V @ 400 mA Max.: 5 V @ 2.7 A
Operating Temperature	0 ~ 60°C (32 ~ 140°F)
Storage Temperature	-20 ~ 70°C (-4 ~ 158°F)
Storage Humidity	5 ~ 95% RH, non-condensing

Ordering Information

PCI-1753	96-ch Digital I/O PCI Card
PCI-1753E	Extension Board for PCI-1753

Accessories

ADAM-3968	68-pin DIN-rail SCSI Wiring Board
ADAM-3968/20	68-pin SCSI to 3 20-pin Box Header Board
ADAM-3968/50	68-pin SCSI to 2 50-pin Box Header Board
PCLD-8751	48-ch Isolated Digital Input Board
PCLD-8761	24-ch Replay/ Isolated Digital Input Board
PCLD-8762	48-ch Relay Board
PCL-10268-2E	100-pin to Two 68-pin SCSI Cables, 1 m and 2 m

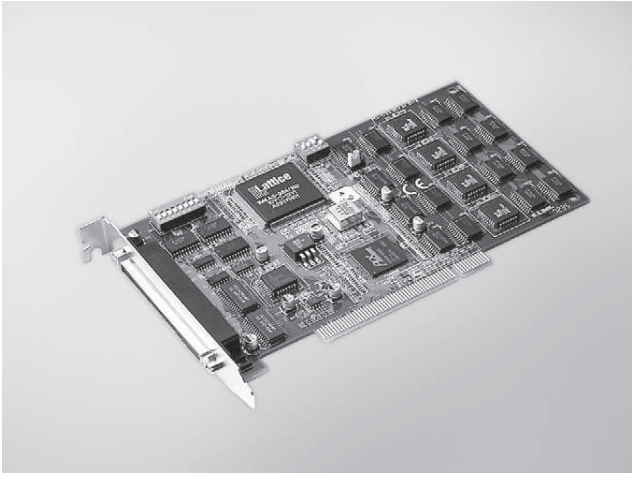
Pin Assignments

PA00	1	51	PA20
PA01	2	52	PA21
PA02	3	53	PA22
PA03	4	54	PA23
PA04	5	55	PA24
PA05	6	56	PA25
PA06	7	57	PA26
PA07	8	58	PA27
PB00	9	59	PB20
PB01	10	60	PB21
PB02	11	61	PB22
PB03	12	62	PB23
PB04	13	63	PB24
PB05	14	64	PB25
PB06	15	65	PB26
PB07	16	66	PB27
PC00	17	67	PC20
PC01	18	68	PC21
PC02	19	69	PC22
PC03	20	70	PC23
PC04	21	71	PC24
PC05	22	72	PC25
PC06	23	73	PC26
PC07	24	74	PC27
GND	25	75	GND
PA10	26	76	PA30
PA 11	27	77	PA31
PA12	28	78	PA32
PA13	29	79	PA33
PA14	30	80	PA34
PA15	31	81	PA35
PA16	32	82	PA36
PA17	33	83	PA37
PB10	34	84	PB30
PB1 1	35	85	PB31
PB12	36	86	PB32
PB13	37	87	PB33
PB14	38	88	PB34
PB15	39	89	PB35
PB16	40	90	PB36
PB17	41	91	PB37
PC10	42	92	PC30
PC1 1	43	93	PC31
PC12	44	94	PC32
PC13	45	95	PC33
PC14	46	96	PC34
PC15	47	97	PC35
PC16	48	98	PC36
PC17	49	99	PC37
VCC	50	100	VCC

PA00 ~PA07: I/O pins of Port A0
PA10 ~PA17: I/O pins of Port A1
PA20 ~PA27: I/O pins of Port A2
PA30 ~PA37: I/O pins of Port A3
PB00 ~PB07: I/O pins of Port B0
PB10 ~PB17: I/O pins of Port B1
PB20 ~PB27: I/O pins of Port B2
PB30 ~PB37: I/O pins of Port B3
PC00 ~PC07: I/O pins of Port C0
PC10 ~PC17: I/O pins of Port C1
PC20 ~PC27: I/O pins of Port C2
PC30 ~PC37: I/O pins of Port C3
GND: Ground
VCC: +5V voltage output

PCI-1755

80 MB/s, 32-ch Digital I/O PCI Card



FCC CE

Features

- Bus-mastering DMA data transfer with scatter gather technology
- 32/16/8-bit pattern I/O with start and stop trigger function, 2 modes handshaking I/O Interrupt handling capability
- Onboard active terminators for high speed and long distance transfer
- Pattern match and change state detection interrupt function
- General-purpose 8-ch digital I/O

Introduction

The PCI-1755 supports PCI-bus mastering DMA for high-speed data transfer. By setting aside a block of memory in the PC, the PCI-1755 performs bus-mastering data transfers without CPU intervention, setting the CPU free to perform other more urgent tasks such as data analysis and graphic manipulation. The function allows users to run all I/O functions simultaneously at full speed without losing data.

Specifications

Digital Input

- **Channels** General: 8 (shared with output)
High speed: 32 (shared with output)
- **Compatibility** 5V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Interrupt Capable Ch.** DI00~DI07

Digital Output

- **Channels** General: 8 (shared with input)
High speed: 32 (shared with input)
- **Compatibility** 5V/TTL
- **Output Voltage** Logic 0: 0.5 V max.
Logic 1: 2.7 V min.
- **Output Capacity** Sink: 0.5 V @ 48 mA
Source: 2.4 V @ 15 mA

Transfer Characteristics

- **Onboard FIFO** 16 KB for DI & 16 KB DO channels
- **Data Transfer Mode** Bus Mastering DMA with Scatter-Gather
- **Data Transfer Bus Width** 8/16/32 bits (programmable)
- **Max. Transfer Rate** DI: 80 M bytes/sec, 32-bit @ 20 MHz
120 M bytes/sec, 32-bit @ 40 MHz
external pacer when data length is less than FIFO size
DO: 80 MBytes/sec, 32-bit @ 20 MHz
- **Operation Mode** Handshaking

General

- **Bus Type** PCI V2.2
- **I/O Connectors** 1 x 100-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 1 A
Max.: 5 V @ 1 A
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 85°C (-4 ~ 185°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

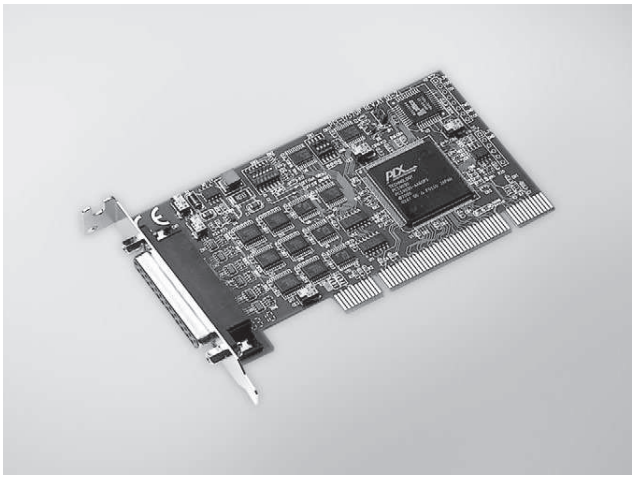
- **PCI-1755** 80 MB/s, 32-ch Digital I/O PCI Card

Accessories

- **ADAM-39100** 100-pin DIN-rail SCSI Wiring Board
- **PCL-101100-1E** 100-pin SCSI High-Speed Cable, 1 m

PCI-1757UP

24-ch Digital I/O Low Profile Universal PCI Card



Features

- Low profile PCI form factor
- Universal PCI bus
- 24 TTL level digital I/O channels
- Emulates mode 0 of 8255 PPI
- Buffered circuits provide higher driving capability
- Interrupt handling capability
- Output status read-back
- I/O configurable by software or on board DIP switch
- Keeps the output settings and values after system hot reset
- BoardID™ switch
- Convenient DB25 connector
- Supports both dry and wet contact

Introduction

PCI-1757UP is a 24-channel digital I/O low profile PCI card that meets the PCI standard REV.2.2 (universal PCI expansion card). The card also works with 3.3 V and 5 V PCI slots, and provides you with 24 parallel digital input/output channels that emulate mode 0 of the 8255 PPI chip. However, the buffered circuits offer a higher driving capability than the 8255.

Specifications

Digital Input

- **Channels** 24 (shared with output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V @ -0.2 mA
  Logic 1: 2.0 V @ 20 mA
- **Interrupt Capable Ch.** 2

Digital Output

- **Channels** 24 (shared with input)
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.5 V max.
  Logic 1: 3.7 V min.
- **Output Capability** Sink: 0.5 V @ 24 mA
  Source: 3.7 V @ 24 mA

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x DB25 female connector
- **Dimensions (L x H)** 120 x 64 mm (4.7" x 2.5") Low profile MD1
- **Power Consumption** Typical: 5 V @ 140 mA
  Max.: 5 V @ 200 mA
- **Operating Temperature** 0 ~ 70°C (32 ~ 158°F)
- **Storage Temperature** -20 ~ 80°C(-4 ~ 176°F)
- **Storage Humidity** 5 ~ 95% non-condensing

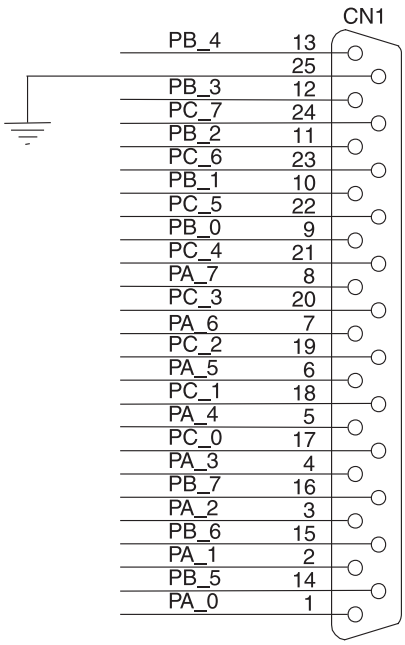
Ordering Information

- **PCI-1757UP** 24-ch Digital I/O Low Profile Universal PCI Card

Accessories

- **ADAM-3925** DB25 DIN-rail Wiring Board
- **PCL-10125-1E** DB25 Cable, 1 m
- **PCL-10125-3E** DB25 Cable, 3 m

Pin Assignments

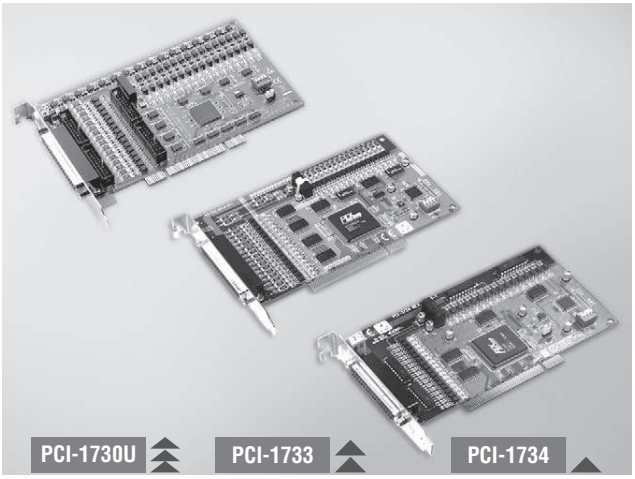


PCI-1730U
PCI-1733
PCI-1734

32-ch Isolated Digital I/O Universal PCI Card

32-ch Isolated Digital Input PCI Card

32-ch Isolated Digital Output PCI Card



FCC CE RoHS COMPLIANT 2002/95/EC

Features

- ISA-compatible with PCL-730/733/734
- 32-ch isolated DI/O (16-ch digital input, 16-ch digital output)
- 32-ch TTL DI/O (16-ch digital input,16-ch digital output) (PCI-1730U only)
- High output driving capacity
- Interrupt handling capability
- 2 x 20-pin connectors for isolated DI/O channels (PCI-1730U only)
- 2 x 20-pin connectors for TTL DI/O channels (PCI-1730U only)
- D-type connector for isolated input and output channels
- High-voltage isolation on output channels

Introduction

PCI-1730U, PCI-1733, and PCI-1734 offer isolated digital input channels as well as isolated digital output channels with isolation protection up to 2,500 V_{DC}, which makes them ideal for industrial applications where high-voltage isolation is required. There are also 32 TTL digital I/O channels on PCI-1730U.

Specifications

Digital Input (PCI-1730U only)

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Interrupt Capable Ch.** 2 (DI0, DI1)

Isolated Digital Input (PCI-1730U/ PCI-1733)

- **Channels** 16
- **Input Voltage** Logic 0: 1 V max. (2 V max.)
Logic 1: 5V min. (30 V max.)
- **Interrupt Capable Ch.** 2 (IDI0, IDI1)
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 25 µs
- **Input Resistance** 2.7 kΩ @ 1 W

Digital Output (PCI-1730U only)

- **Channels** 16
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Output Capability** Sink: 0.8 V @ 24 mA
Source: 2.0 V @ 15 mA

Isolated Digital Output (PCI-1730U/ PCI-1734)

- **Channels** 16
- **Output Type** Sink type (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** PCI-1730U: 300 mA max./channel
PCI-1734: 200 mA max./channel
- **Opto-Isolator Response** 25 µs

General

- **Bus Type** PCI V2.2 (Universal PCI V2.2 for PCI-1730U)
- **I/O Connectors** 1 x DB37 female connector
4 x 20-pin box header (PCI-1730U only)
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 250 mA, 12 V @ 35 mA
Max.: 5 V @ 400 mA, 12 V @ 60 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -25 ~ 85°C (-13 ~ 185°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

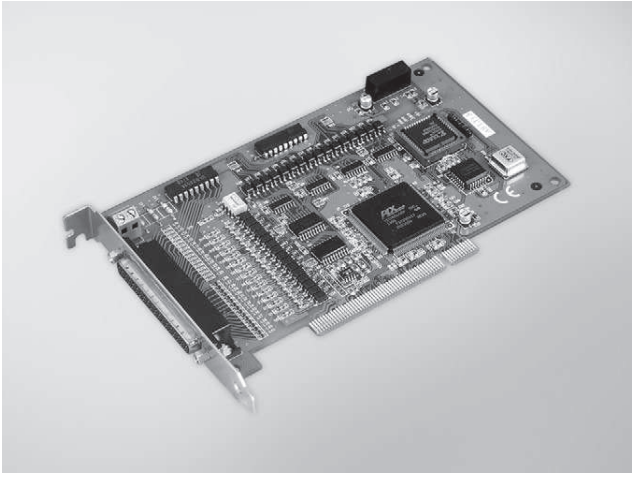
- **PCI-1730U** 32-ch Isolated Digital I/O Univ. PCI Card
- **PCI-1733** 32-ch Isolated Digital Input PCI Card
- **PCI-1734** 32-ch Isolated Digital Output PCI Card

Accessories

- **PCL-10120-1E** 20-pin Flat Cable, 1 m
- **PCL-10120-2E** 20-pin Flat Cable, 2 m
- **ADAM-3920** 20-pin DIN-rail Flat Cable Wiring Board
- **PCLD-782** 16-ch Isolated DI Board w/ 1m 20-pin Flat Cable
- **PCLD-885** 16-ch Power Relay Board w/ 20p & 50p Flat Cables
- **PCLD-785** 16-ch Relay Board w/ One 1m 20-pin Flat Cable
- **ADAM-3937** DB37 DIN-rail Wiring Board
- **PCL-10137-1E** DB37 Cable, 1 m
- **PCL-10137-2E** DB37 Cable, 2 m
- **PCL-10137-3E** DB37 Cable, 3 m

PCI-1750

32-ch Isolated Digital I/O and 1-ch Counter PCI Card



Features

- 16 isolated DI and 16 isolated DO channels
- High voltage isolation on all isolated channels (2,500 V_{DC})
- High sink current on isolated output channels (200 mA/channel)
- Supports dry contact or 5 ~ 50 V_{DC} isolated inputs
- Interrupt handling capability
- Timer/counter interrupt capability

Introduction

PCI-1750 offers 16 isolated digital input channels, 16 isolated digital output channels, and one isolated counter/timer for the PCI bus. With isolation protection of 2,500 V_{DC}, and dry contact support, PCI-1750 is ideal for industrial applications where high-voltage protection is required. Each I/O channel of the PCI-1750 corresponds to a bit in a PC I/O port. This makes PCI-1750 very easy to program. This card also offers a counter or timer interrupt and two digital input interrupt lines to a PC, so you can then easily configure the card with software.

Specifications

Isolated Digital Input

- **Channels** 16
- **Input Voltage** Logic 0: 2 V max.
  Logic 1: 5 V min. (30 V_{DC} max.) or dry contact
- **Interrupt Capable Ch.** 2
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 100 µs

Isolated Digital Output

- **Channels** 16
- **Output Type** Sink (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 200 mA max. per channel
- **Opto-Isolator Response** 100 µs

Counter/Timer

- **Channels** 1
- **Resolution** 1 x 16-bit isolated counter
- **Input Voltage** Logic 0: 2V max.
  Logic 1: 5V min. (30V_{DC} max.)
- **Max. Input Frequency** 1 MHz
- **Isolation Protection** 2,500 V_{DC}

General

- **Bus Type** PCI V2.2
- **I/O Connectors** 1 x DB37 female connector
  1 x 2-pin terminal block for extended ground
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 850 mA
  Max.: 5 V @ 1.0 A
- **Operating Temperature** 0 ~ 70°C (32 ~ 158°F)
- **Storage Temperature** -20 ~ 80°C (-4 ~ 176°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

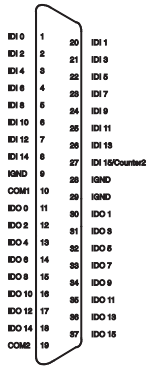
Ordering Information

- **PCI-1750** 32-ch Isolated Digital I/O and Counter PCI Card

Accessories

- **PCL-10137-1E** DB37 Cable, 1 m
- **PCL-10137-2E** DB37 Cable, 2 m
- **PCL-10137-3E** DB37 Cable, 3 m
- **ADAM-3937** DB37 DIN-rail Wiring Board

Pin Assignments

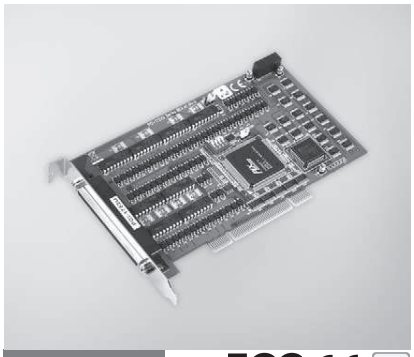


PCI-1752U
PCI-1754
PCI-1756

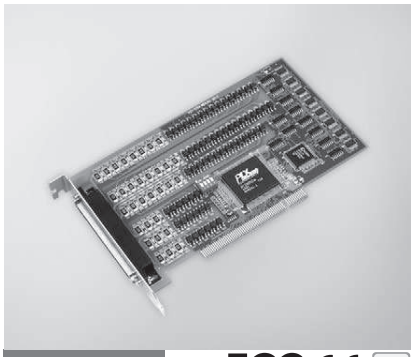
64-ch Isolated Digital Output Universal PCI Card

64-ch Isolated Digital Input PCI Card

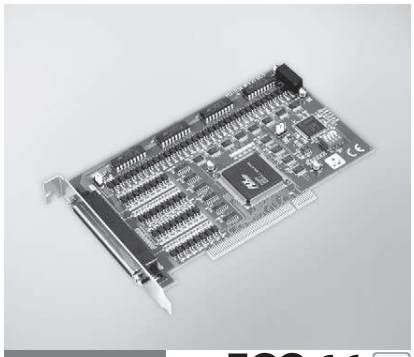
64-ch Isolated Digital I/O PCI Card



PCI-1752U



PCI-1754



PCI-1756

Features

- 64 isolated digital output channels
- High-voltage isolation on output channels (2,500 V_{DC})
- Wide output range (5 ~ 40 V_{DC})
- High-sink current on isolated output channels (200 mA max./channel)
- Output status readback
- Keeps the output settings and values after system hot reset
- Channel-freeze function
- High-density 100-pin SCSI connector

Specifications

Isolated Digital Output

- **Channels** 64 (16-ch/group)
- **Output Type** Sink (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 200 mA max./channel
- **Opto-isolator Response** 25 µs

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x 100-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 230 mA Max.: 5 V @ 500 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95%, RH non-condensing

Ordering Information

- **PCI-1752U** 64-ch Isolated Digital Output Universal PCI Card

Accessories

- **PCL-10250-1E** 100-pin SCSI to Two 50-pin SCSI Cable, 1 m
- **ADAM-3951** 50-pin DIN-rail Wiring Board w/ LED Indicators

Features

- 64 isolated digital input channels
- Either ± voltage input for DI by group
- High-voltage isolation on input channels (2,500 V_{DC})
- High over-voltage protection (70 V_{DC})
- Wide input range (10 ~ 50 V_{DC})
- 2,000 V_{DC} ESD protection
- Interrupt handling capability
- High-density 100-pin SCSI connector

Specifications

Isolated Digital Input

- **Channels** 64 (16-ch/group)
- **Input Voltage** Logic 0: 3 V max. Logic 1: 10 V min. (50 V max.)
- **Input Current (Typical)** 10 V_{DC} @ 1.7 mA, 12 V_{DC} @ 2.1 mA, 24 V_{DC} @ 4.4 mA, 48 V_{DC} @ 9.0 mA, 50 V_{DC} @ 9.4 mA
- **Interrupt Capable Ch.** 4
- **Isolation Protection** 2,500 V_{DC}
- **Overvoltage Protection** 70 V_{DC}
- **ESD** 2,000 V_{DC}
- **Opto-Isolator Response** 25 µs

General

- **Bus Type** PCI V2.2
- **I/O Connectors** 1 x 100-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 340 mA Max.: 5 V @ 450 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

- **PCI-1754** 64-ch Isolated Digital Input PCI Card

Accessories

- **PCL-10250-1E** 100-pin SCSI to Two 50-pin SCSI Cable, 1 m
- **ADAM-3951** 50-pin DIN-rail Wiring Board w/ LED Indicators

Features

- Either ± voltage input for DI by group
- High-voltage isolation input/output channels (2,500 V_{DC})
- 2,000 V_{DC} ESD protection for DI
- High over-voltage protection (70 V_{DC}) for DI
- High-sink current on isolated output channels (200 mA max./channel)
- Output status readback
- Keeps output settings/ values after system hot reset
- Interrupt handling capability
- High-density 100-pin SCSI connector

Specifications

Isolated Digital Input

- **Channels** 32 (16-ch/group)
- **Input Voltage** Logic 0: 3 V max. Logic 1: 10 V min. (50 V max.)
- **Interrupt Capable Ch.** 2 (IDI0, IDI16)
- **Isolation Protection** 2,500 V_{DC}
- **Overvoltage Protection** 70 V_{DC}
- **ESD** 2,000 V_{DC}
- **Opto-Isolator Response** 25 µs
- **Input Current** 10 V_{DC} @ 1.7 mA, 12 V_{DC} @ 2.1 mA, 24 V_{DC} @ 4.4 mA, 48 V_{DC} @ 9.0 mA, 50 V_{DC} @ 9.4 mA

Isolated Digital Output

- **Channels** 32 (16-ch/group)
- **Output Type** Sink (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 200 mA max./channel
- **Opto-isolator Response** 25 µs

General

- **Bus Type** PCI V2.2
- **I/O Connectors** 1 x 100-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 285 mA Max.: 5 V @ 475 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95%, non-condensing

Ordering Information

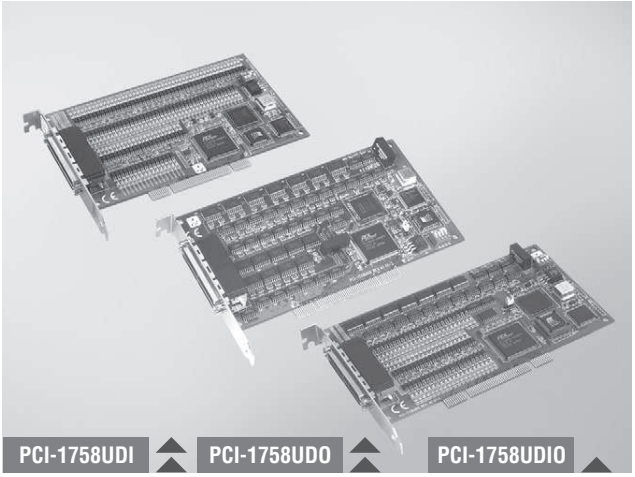
- **PCI-1756** 64-ch Isolated Digital I/O PCI Card

Accessories

- **PCL-10250-1E** 100-pin SCSI to Two 50-pin SCSI Cable, 1 m
- **ADAM-3951** 50-pin DIN-rail Wiring Board w/ LED Indicators

PCI-1758UDI
PCI-1758UDO
PCI-1758UDIO

128-ch Isolated Digital Input Universal PCI Card
128-ch Isolated Digital Output Universal PCI Card
128-ch Isolated Digital I/O Universal PCI Card



FCC CE RoHS COMPLIANT 2002/95/EC

Features

PCI-1758UDO and PCI-1758UDIO

- 128 isolated digital output channels (64 channels for PCI-1758UDIO)
- High-voltage isolation on output channels (2,500 V_{DC})
- Wide output range (5 ~ 40 V_{DC})
- High-sink current for isolated output channels (90 mA max./channel)
- Current protection for each port
- BoardID™ switch
- Output status read-back
- Digital output value retained after hot system reset
- Programmable Power-up States
- Watchdog timer

PCI-1758UDI and PCI-1758UDIO

- 128 isolated digital input channels (64 channels for PCI-1758UDIO)
- Wide input range (5 ~ 25 V_{DC})
- High ESD protection (2,000 V_{DC})
- Digital Filter function
- BoardID™ switch
- Interrupt handling capability for each channel

Specifications

Isolated Digital Input

- **Channels** PCI-1758UDI: 128
PCI-1758UDIO: 64
- **Input Voltage** Logic 0: 2.5 V max.
Logic 1: 5 V min. (25 V max.)
- **Interrupt Capable Ch.** PCI-1758UDI: 128
PCI-1758UDIO: 64
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 20 µs
- **Input Resistance** 3 kΩ

Isolated Digital Output

- **Channels** PCI-1758UDO: 128
PCI-1758UDIO: 64
- **Output Type** Sink (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 90 mA max./channel
- **Opto-isolator Response** 20 µs

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x mini-SCSI HDRA-E100 female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption**

	PCI-1758UDI	PCI-1758UDO	PCI-1758UDIO
Typical	5 V @ 0.3 A	5 V @ 1.1 A	5 V @ 1.2 A
Max.	5 V @ 0.6 A	5 V @ 2.2 A	5 V @ 1.8 A

- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F) (IEC 68-2-1, 2)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% non-condensing

Ordering Information

- **PCI-1758UDI** 128-ch Isolated DI Universal PCI Card
- **PCI-1758UDO** 128-ch Isolated DO Universal PCI Card
- **PCI-1758UDIO** 128-ch Isolated Digital I/O Universal PCI Card

Accessories

- **PCL-101100S-1E** 100-pin Mini-SCSI Cable, 1 m
- **PCL-101100S-2E** 100-pin Mini-SCSI Cable, 2 m
- **ADAM-39100** 100-pin DIN-rail SCSI Wiring Board

Feature Details

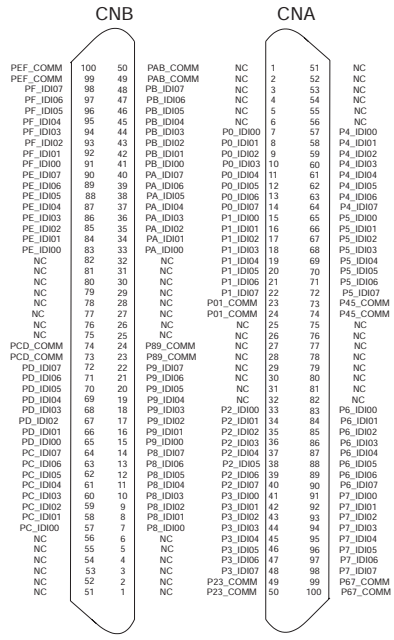
Interrupt Function (PCI-1758UDI/PCI-1758UDIO)

PCI-1758UDI and PCI-1758UDIO provide an interrupt function for every digital input channel. You can disable/enable the interrupt functions, and select trigger type by setting the Rising Edge Interrupt Registers or Falling Edge Interrupt Registers of the card. When the interrupt request signals occur, software will service these interrupt requests by ISR. The multiple interrupt sources provide the card with more flexibility.

Digital Filter Function (PCI-1758UDI/PCI-1758UDIO)

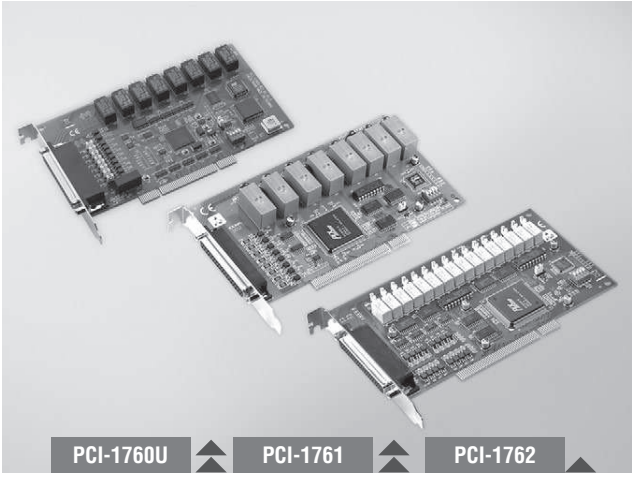
The digital filter function is used to eliminate glitches on input data and reduce the number of changes to examine and process. The filter blocks pulses that are shorter than the specified timing interval and passes pulses that are twice as long as the specified interval. Intermediate-length pulses that are longer than half of the interval, but less than the interval, may or may not pass the filter.

Pin Assignments



PCI-1760U
PCI-1761
PCI-1762

8-ch Relay and 8-ch Isolated Digital Input Universal PCI Card with 10-ch Counter/Timer
8-ch Relay and 8-ch Isolated Digital Input PCI Card
16-ch Relay and 16-ch Isolated Digital Input PCI Card



RoHS COMPLIANT 2002/95/EC FCC CE

Features

- Universal PCI card, for 3.3 V and 5 V PCI slot
- 8 opto-isolated digital input channels
- 8 relay actuator output channels
- 2 opto-isolated PWM outputs
- LED indicators to show activated relays
- Jumper selectable dry contact/wet contact input signals
- Up event counters for DI
- Programmable digital filter function for DI
- Pattern match interrupt function for DI
- "Change of state" interrupt function for DI
- Universal PCI and BoardID switch

Introduction

PCI-1760U relay actuator and isolated digital input card is a PC add-on card for the PCI bus. It meets the PCI standard Rev. 2.2 (Universal PCI expansion card), and works with both 3.3 V and 5 V PCI slots. It provides 8 opto-isolated digital inputs with isolation protection of 2,500 V_{DC} for collecting digital inputs in noisy environments, 8 relay actuators that can be used as a on/off control devices or small power switches, and 2 isolated PWM (Pulse Width Modulation) outputs for custom applications.

For easy monitoring, each relay is equipped with one red LED to show its on/off status. Each isolated input supports both dry contact and wet contact so that it can easily interface with other devices when no voltage is present in the external circuit.

Specifications

Isolated Digital Input

- **Channels** 8 (Sink)
- **Input Voltage** Logic 0: 1.0 V max.
Logic 1: 4.5 V min. (12 V max.)
- **Interrupt Capable Ch.** 8 (IDI0 ~ IDI7)
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 100 µs
- **Input Resistance** 2 kΩ 1/4 W

Counter/Timer

- **Channels** 8
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 500 Hz
- **Isolation Protection** 2,500 V_{DC}
- **PWM Channels** 2
- **Digital Noise Filter** Min. effective high input period ≥ [(2 ~ 65535) x 5 ms] + 5 ms
Min. effective low input period ≥ [(2 ~ 65535) x 5 ms] + 5 ms

Relay Output

- **Channels** 8
- **Relay Type** 2 x Form C, and 6 x Form A
- **Contact Rating** 1 A @ 125 V_{AC}, 2 A @ 30 V_{DC}
- **Max. Switching Power** 125 VA, 60 W
- **Max. Switching Voltage** 250 V_{AC}, 220 V_{DC}
- **Max. Switching Current** 2 A
- **Operate/Release Time** max. 5 / 3.5 ms
- **Resistance** Contact: 50 mΩ max.
Insulation: 100 MΩ min. @ 500 V_{DC}
- **Life Expectancy (Electrical)** 3 x 10^5 cycles min.: 2 A @ 30 V_{DC}, 1 A @ 125 V_{AC}
10^6 cycles min.: 1 A @ 30 V_{DC}, 0.5 A @ 125 V_{AC}

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x DB37 female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 450 mA
Max.: 5 V @ 850 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95 % RH, non-condensing

Ordering Information

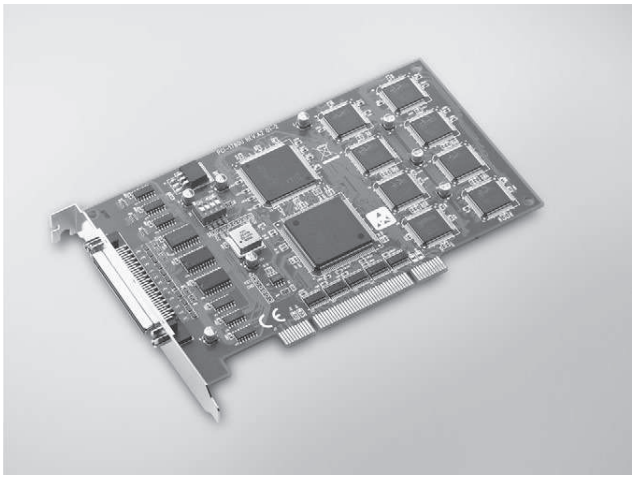
- **PCI-1760U** 8-ch Relay/IDI PCI Card w/ 10-ch Counter/Timer

Accessories

- **PCL-10137-1E** DB37 Cable, 1 m
- **PCL-10137-2E** DB37 Cable, 2 m
- **PCL-10137-3E** DB37 Cable, 3 m
- **ADAM-3937** DB37 DIN-rail Wiring Board

PCI-1780U

8-ch, 16-bit Counter/Timer Universal PCI Card



FCC CE RoHS

Features

- 8 independent 16-bit counters
- 8 programmable clock source
- 8 digital TTL outputs and 8 digital TTL inputs
- Up to 20 MHz input frequency
- Multiple counter clock source selectable
- Counter output programmable
- Counter gate function
- Flexible interrupt source select
- BoardID™ switch

Introduction

PCI-1780U is a general purpose multi-channel counter/timer card for the PCI bus. It targets the AM9513 to implement the counter/timer function by CPLD. It provides eight 16-bit counter channels, 8 digital outputs and 8 digital inputs. Its powerful counter functions cater to a broad range of industrial and laboratory applications.

The card features 12 programmable counter modes, to provide one shot output, PWM output, periodic interrupt output, time-delay output, and to measure the frequency and the pulse width. The PCL-10168 shielded cable works well with PCI-1780U to reduce noise. Its wires are all twisted pairs, and the input signals and output signals are separately shielded, providing minimal cross talk between signals and the best protection against EMI/EMC problems.

Specifications

Digital Input

- **Channels** 8
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.0 V min.
- **Interrupt Capable Ch.** Ch. 0

Digital Output

- **Channels** 8
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.8 V
Logic 1: 2.0 V
- **Output Capability** Sink: 0.8 V @ 24 mA
Source: 2.0 V @ 15 mA

Counter/Timer

- **Channels** 8 (independent)
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 20 MHz
- **Reference Clock** Internal: 20 MHz
External clock: 20 MHz max.
- **Counter Modes** 12 (programmable)
- **Interrupt Capable Ch.** 8
- **PWM Channels** 8

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x 68-pin SCSI female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: 5 V @ 900 mA
Max.: 5 V @ 1.2 A
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

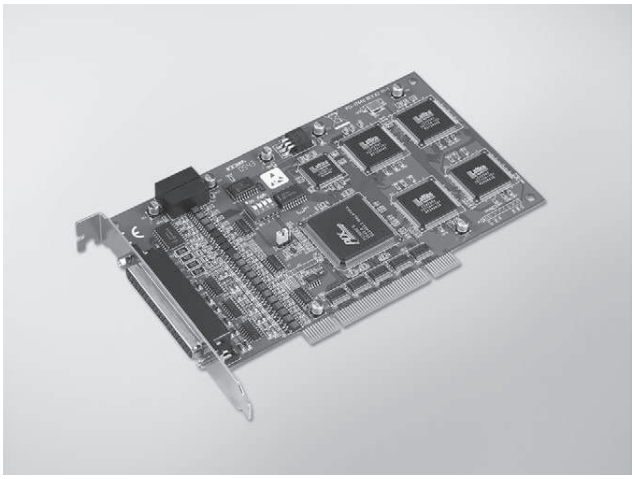
- **PCI-1780U** 8-ch, 16-bit Counter/Timer Universal PCI Card

Accessories

- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m
- **ADAM-3968** 68-pin DIN-rail SCSI Wiring Board

PCI-1784U

4-axis Quadrature Encoder and 4-ch Counter Universal PCI Card with 8-ch Isolated Digital I/O



Features

- 4 x 32-bit up/down counters
- Single-ended or differential inputs
- Pulse/direction and up/down counter
- x1, x2, x4 counts for each encoder cycle
- Optically isolated up to 2,500 V_{DC}
- 4-stage digital filter with selectable sampling rate
- Onboard 8-bit timer with wide range time-base selector
- Multiple interrupt sources for precision application
- 4 x isolated digital input and 4 x isolated digital output
- BoardID™ switch

Introduction

PCI-1784U is a 4-axis quadrature encoder and counter add-on card for PCI bus. The card includes four 32-bit quadruple A/B phase encoder counters, 8-bit timer with multi range time-base selector and 4 isolated digital inputs as well as 4 isolated digital outputs. Its flexible interrupt sources are suitable for motor control and position monitoring.

Specifications

Encoder Input

- **Number of Axes** 4 (independent)
- **Resolution** 32-bit
- **Max. Quadrature Input** 1.0 MHz with digital filter
2.0 MHz without digital filter
- **Digital Filter** 4 stage
- **Drive Type** Single-ended or differential
- **Counter Modes** Quadrature, up/down, pulse/direction
- **Isolation Protection** 2,500 V_{DC}
- **Max. Input Pulse Freq.** x 1, x 2, x 4
- **Sample Clock Freq.** 8, 4, 2, or 1 MHz

Input Range

- **Single Ended Configuration** Logic 0 : 0.8 V max.
Logic 1 : 2.8 V min. (12 V max.)
- **Differential Configuration** Logic 0 : -0.2 V max.
Logic 1 : 0.2 V min. (±12 V max.)

Isolated Digital Input

- **Channels** 4
- **Input Voltage** Logic 0 : 3 V max.
Logic 1 : 10 V min. (30 V max.)
- **Interrupt Capable Ch.** DI0 ~ DI3
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 100 µs
- **Overvoltage Protection** 70 V_{DC}

Isolated Digital Output

- **Channels** 4
- **Compatibility** 5V
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** Logic 0: 0.8 V min.
Logic 1: 2.0 max.
- **Sink/Source Current** 50 mA max./channel
- **Opto-Isolator Response** 2 us

Counter/Timer

- **Channels** 4
- **Resolution** 32 bits
- **Compatibility** 5 V/TTL
- **Max.Input Frequency** 8 MHz
- **Counter Modes** Quadrature, 2-pulse, pulse/direction
- **Interrupt Capable Ch.** Counter0 ~ Counter3
- **Digital Noise Filter** 4 stage

General

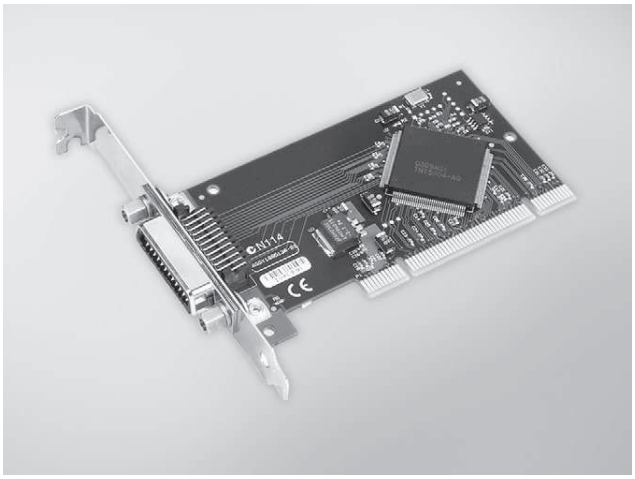
- **Bus Type** Universal PCI V2.2
- **Connectors** 37-pin D-sub female connector
- **Dimensions (L x H)** 175 x 100 mm (6.9" x 3.9")
- **Power Consumption** Typical: +5 V @ 200 mA
Max.: +5 V @ 450 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing (refer to IEC 68-2-3)
- **Certification** CE

Ordering Information

- **PCI-1784U** 4-axis Quadrature Encoder and Counter Card
- **PCL-10137H-3E** High-speed DB37 Cable, 3 m
- **ADAM-3937** DB37 DIN-rail Wiring Board

PCI-1671UP

IEEE-488.2 Interface Low Profile Universal PCI Card



Features

- IEEE 488.2 Standard interface
- Complete Talker/Listener/Controller
- Industry standard 32-bit PCI bus
- Data transfer rates over 1.5 MB/s
- 1,024-word FIFO buffer
- High-Speed State Machine Bus Manager
- 7 Interrupt lines, shared interrupt capability
- Transparent interrupt enabling/disabling
- Includes GPIB-Library software
- Low profile MD1 size

Introduction

The PCI-1671UP IEEE-488 interface converts any PCI bus personal computer into an instrumentation control and data acquisition system. Connect up to 14 instruments using standard IEEE-488 cables such as the PCL-10488-2, 2 meter IEEE-488 interface cable. The PCI-1671UP transfers data over the GPIB at rates in excess of 1.5 million bytes per second using the maximum IEEE-488 specification cable length (2 meters times the # of devices). A 1,024-word FIFO buffer and the advanced REP-INSW ISR data transfer method provide the horsepower required to then transfer the data between the GPIB board and the host computer. The high-speed state machine also provides byte-to-word packing and unpacking, and because words carry twice the information that bytes do, packed data requires fewer bus cycles to transfer the same GPIB information.

The PCI-1671UP adheres to ANSI/IEEE Standard 488-1978. Often referred to as the IEEE-488.2 bus, GPIB bus or HP-IB bus, the GPIB (General Purpose Interface Bus) is a standard for instrumentation communication and control for instruments from manufacturers the world over. The GPIB provides handshaking and interface communications over an 8-bit data bus employing 5 control and 3 handshake signals. Equipped with PCI-1671UP, a personal computer can control GPIB instruments, gather data from GPIB test equipment, or become a data acquisition station in a GPIB system.

Specifications

GPIB

- **Compatibility** IEEE 488.1, 488.2
- **GPIB Transfer Rate** 1.5 MB/s
- **OS Support** Windows® 2000/XP/Vista and Win 7
- **Library Support** Visual C++, Visual C#, Visual Basic, Visual Basic .NET, Delphi, LabView
- **Max. GPIB Connections** 15 (14 Listener)

General

- **Bus Type** Universal PCI V2.2
- **I/O Connectors** 1 x 24-pin IEEE 488
- **Dimensions (L x H)** 120 x 64 mm (Low profile MD1)
- **Power Consumption** 5 V_{DC} @ 375 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 158°F) @ 0-90% RH
- **Storage Temperature** -40 ~ 100°C (-40 ~ 212°F) @ 5-90% RH
- **Operating Humidity** 0 ~ 90% RH, non-condensing

Ordering Information

- **PCI-1671UP** High-perform. IEEE-488.2 Interface PCI Card

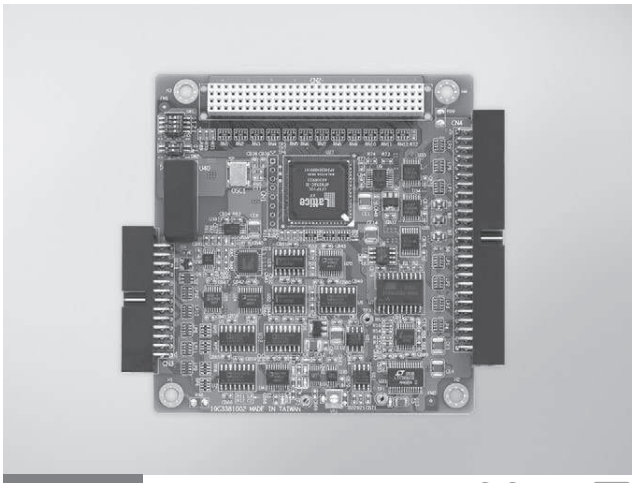
Accessories

- **PCL-10488-2** IEEE-488 Cable, 2 m

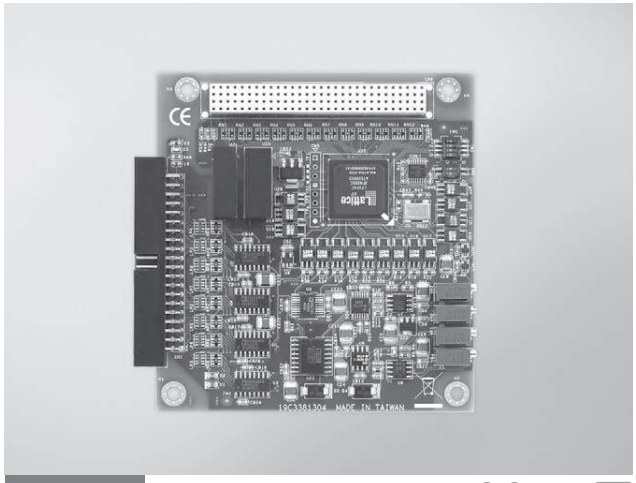
PCM-3810I
PCM-3813I

250 kS/s, 12-bit, 16-ch Multifunction PCI-104 Module

100 kS/s, 12-bit, 32-ch Isolated Analog Input PCI-104 Module



PCM-3810I



PCM-3813I

Specifications

Analog Input

- **Channels** 16 single-ended or 8 differential or combination
- **Resolution** 12 bits
- **Max. Sampling Rate** 250 kS/s
- **Ring Buffer Size** 4,096 samples
- **Input Range and Gain List**

Gain	0.5	1	2	4	8
Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625

- **Input Protection** 30 Vp-p
- **Sampling Mode** Polling, pacer, double-clock, or external clock
- **Trigger Mode** Pre-trigger, post-trigger, delay-trigger, about-trigger

Analog Output

- **Channels** 2
- **Output Range** Internal Reference (V): 0 ~ 5, 0 ~ 10, ±5, ±10
  External Reference: 0 ~ +x V @ +x V (-10 ≤ x ≤ 10)
  -x ~ +x V @ +x V (-10 ≤ x ≤ 10
- **Resolution** 12 bits
- **Output Rate** 250 kS/s
- **Ring Buffer Size** 4,096 samples
- **Slew Rate** 20 V/μs
- **Operation Mode** Software polling, continuous out

Digital Input/Output

- **Channels** 16
- **Compatibility** 5V/TTL

Counter/Timer

- **Channels** 3 (independent)
- **Resolution** 24 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 10 MHz
- **Counter Modes** 12 (programmable)
- **Interrupt Capable Ch.** 3
- **PWM Channels** 3

General

- **Bus Type** PCI-104
- **I/O Connectors** 1 x 26-pin, 1 x 50-pin box header
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~158°F)

Ordering Information

- **PCM-3810I** 250 kS/s, 12-bit Multi. PCI-104 Module

Accessories

- **PCL-10150-1.2E** 50-pin Flat Cable, 1.2 m
- **ADAM-3950** 50-pin DIN-rail Flat Cable Wiring Board

Features

- Compact size with robust design
- 32 single-ended or 16 differential analog inputs
- Programmable gain for each input channel
- Automatic channel/ gain/ SD scanning
- Onboard ring buffer (1,024 samples)
- Isolation protection (2,500 V_{DC})

Specifications

Analog Input

- **Channels** 32 single-ended or 16 differential or combination
- **Resolution** 12 bits
- **Max. Sampling Rate** 100 kS/s
- **Ring Buffer Size** 1,024 samples
- **Input Range and Gain List**

Gain	0.5	1	2	4	8
Unipolar	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Bipolar	±10	±5	±2.5	±1.25	±0.625

- **Input Protect** 30 Vp-p
- **Input Impedance** 100 MΩ/10pF (off); 100 MΩ/100pF (on)
- **Sampling Mode** Software polling, onboard programmable pacer, or external TTL trigger

General

- **Bus Type** PCI-104
- **I/O Connectors** 1 x 40-pin box header
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~158°F)

Ordering Information

- **PCM-3813I** 100 kS/s, 12-bit Isolated AI PCI-104 Module

Accessories

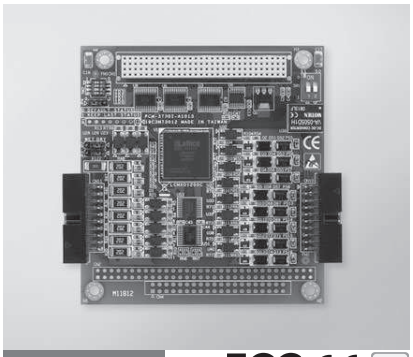
- **PCL-10141-0.2E** IDE#2 40-pin to DB37(F) Flat CABLE, 0.2 m
- **PCL-10137-1E** DB37 Cable, 1 m
- **PCL-10137-2E** DB37 Cable, 2 m
- **PCL-10137-3E** DB37 Cable, 3 m
- **ADAM-3937** DB37 DIN-rail Wiring Board

PCM-3730I
PCM-3753I
PCM-3761I

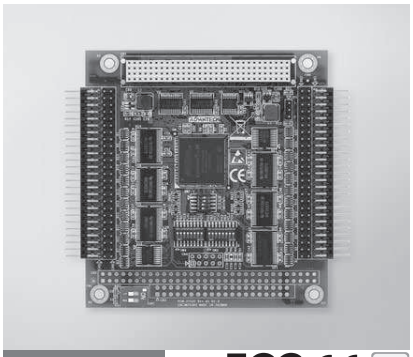
32-ch Isolated Digital I/O PCI-104 Module

96-ch Digital I/O PCI-104 Module

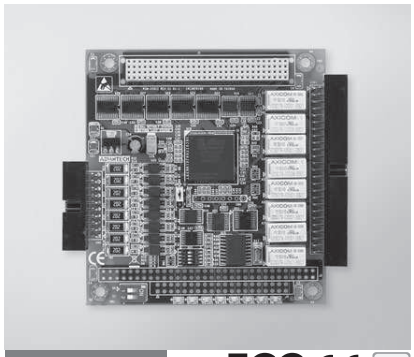
8-ch Relay and 8-ch Isolated Digital Input PCI-104 Module



PCM-3730I



PCM-3753I



PCM-3761I

Features

- Compact size with robust design
- High-voltage isolation on both input and output channels (2,500 V_{DC})
- High output driving capacity
- Interrupt handling capability
- Keep digital output values after system reset

Specifications

Isolated Digital Input

- **Channels** 16
- **Input Voltage** Logic 0: 3 V max.
  Logic 1: 5 V min.
  30 V max.
- **Input Current** 2.5 mA @ 5 V
  15 mA @ 30 V
- **Input Resistance** 2 kΩ
- **Isolation Voltage** 2,500 V_{DC}
- **Over Voltage Protection** 70 V_{DC}
- **Opto-isolator Response Time** 25 µs
- **Interrupt Capable** All channels

Isolated Digital Output

- **Channels** 16
- **Output Voltage Open Collector** 5 ~ 30 V_{DC}
- **Output Sink Current** 250 mA max.
- **Isolation Voltage** 2,500 V_{DC}
- **Over Current Protection** 1.6 A per 8 channels
- **Opto-isolator Response Time** 25 µs

General

- **Bus Type** PCI-104
- **I/O Connectors** 2 x 20-pin box header
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Operating Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Temperature** -50 ~ 120°C (-58 ~ 248°F)

Ordering Information

- **PCM-3730I** 32-ch Isolated Digital I/O PCI-104 Module

Accessories

- **ADAM-3920** 20-pin DIN-rail Wiring Board
- **PCL-10120-1E** 20-pin Flat Cable, 1 m
- **PCL-10120-2E** 20-pin Flat Cable, 2 m

Features

- Compact size with robust design
- Supports dry/wet contact
- Keeps the last output value after system hot reset
- Interrupt handling capacity
- "Pattern match" and "change of state" interrupt functions
- Output status read-back
- Interrupt output pin for simultaneously triggering external devices

Specifications

Digital Input/Output

- **Channels** 96 (bi-directional)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Voltage** Logic 0: 0.4 V max.
  Logic 1: 2.4 V min.
- **Output Capability** Sink: 0.4 V @ 24 mA
  Source: 2.4 V @ 15 mA

General

- **Bus Type** PCI-104
- **I/O Connectors** 4 x 50-pin box header
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Operating Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Temperature** -50 ~ 120°C (-58 ~ 248°F)

Ordering Information

- **PCM-3753I** 96-ch Digital I/O PCI-104 Module w/ 50p Cable

Accessories

- **PCL-10150-1.2E** 50-pin Flat Cable, 1.2 m
- **ADAM-3950** 50-pin DIN-rail Flat Cable Wiring Board
- **PCLD-782B** 24-ch IDI Board w/ 20-pin & 50-pin Flat Cables
- **PCLD-785B** 24-ch Relay Board w/ 20-pin & 50-pin Flat Cables

Specifications

Isolated Digital Input

- **Channels** 8
- **Input Voltage** Logic 0: 3 V max.
  Logic 1: 5 V min., 30 V max.
- **Input Current** 2.5 mA @ 5 V, 15 mA @ 30 V
- **Input Resistance** 2 kΩ 0.5 W
- **Isolation Protection** 2,500 V_{DC}
- **Overvoltage Protection** 70 V_{DC}
- **Interrupt Capable** All channels
- **Opto-isolator Response Time** 25 µs

Relay Output

- **Channels** 8
- **Relay Type** DPDT, Form C
- **Contact Rating** 0.25 A @ 250 V_{AC},
  2 A @ 30 V_{DC}
- **Max. Switching Power** 62.5 VA, 60 W
- **Max. Switching Voltage** 250 V_{AC}, 220 V_{DC}
- **Max. Switching Current** 5 A
- **Min. Switching Voltage** 100 µV
- **Operate/Release Time** typ. 3 / 2 ms, max. 5 / 4 ms
- **Resistance** Contact: 50 mΩ max.:
  10 mA @ 20 mV
  Insulation: 1 GΩ min.:
  500 V_{DC}
- **Life Expectancy (Electrical)** 5 x 10^7 cycles typ.:
  10 mA @ 12 V
  2 x 10^5 cycles typ.:
  2000 mA @ 30 V

General

- **Bus Type** PCI-104
- **I/O Connectors** 1 x 50-pin, 1 x 20-pin box header
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)

Ordering Information

- **PCM-3761I** 8-ch Relay/Isolated Digital Input PCI-104 Module

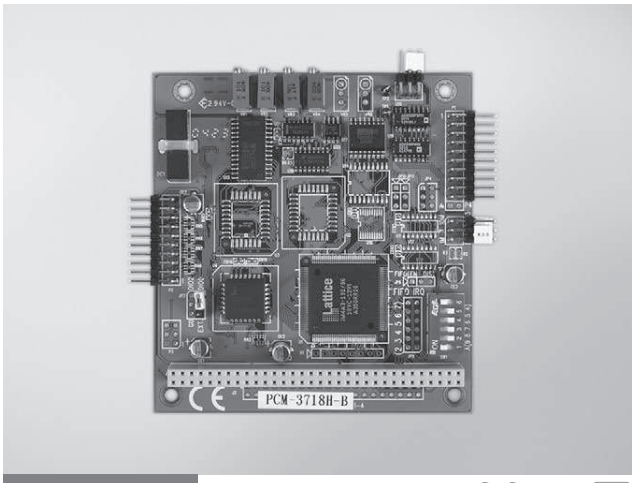
Accessories

- **ADAM-3920** 20-pin DIN-rail Flat Cable Wiring Board
- **ADAM-3950** 50-pin DIN-rail Flat Cable Wiring Board
- **PCL-10150-1.2E** 50-pin Flat Cable, 1.2 m
- **PCL-10120-1E** 20-pin Flat Cable, 1 m
- **PCL-10120-2E** 20-pin Flat Cable, 2 m

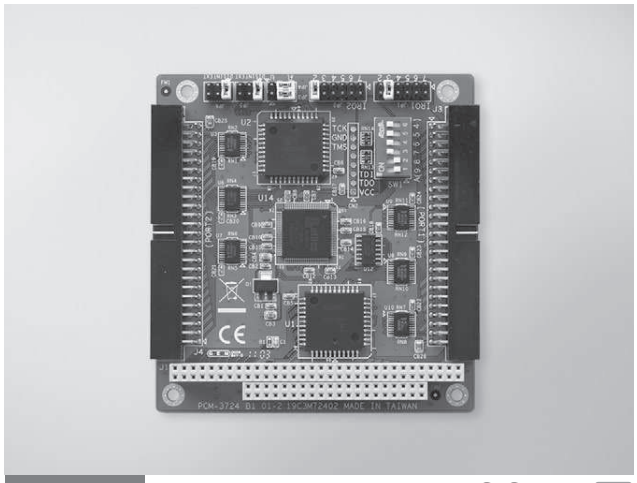
PCM-3718H/HG/HO
PCM-3724

100 kS/s, 12-bit, 16-ch Multifunction PC/104 Module

48-ch Digital I/O PC/104 Module



PCM-3718H/HG/HO



PCM-3724

Specifications

Analog Input

- **Channels** 16 single-ended / 8 differential
- **Resolution** 12 bits
- **Max. Sampling Rate** 100 KHz* (DMA transfer)
  *80 kHz on P4-based (or upper) system
- **Input Impedance** 10 MΩ
- **Sampling Modes** Software, pacer or external
- **Input Range**

PCM-3718H and PCM-3718HO	Bipolar	±10, ±5, ±2.5, ±1.25, ±0.625
	Unipolar	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25
PCM-3718HG	Bipolar	±10, ±5, ±1, ±0.5, ±0.1, ±0.05, ±0.01, ±0.005
	Unipolar	0 ~ 10, 0 ~ 1, 0 ~ 0.1, 0 ~ 0.01

Analog Output (PCM-3718HO only)

- **Channels** 1 (12 bits)
- **Output Range**

Internal Reference	Unipolar (V)	0 ~ 5, 0 ~ 10
External Reference (V)		0 ~10, 0 ~ -10

- **Slew Rate** 10 V/μs
- **Output Impedance** 0.1 W max.

Digital Input/Output

- **Channels** 16, 5V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Output Voltage** Logic 0: 0.33 V max. @ 6 mA
  Logic 1: 3.84 V min. @ 6 mA

General

- **Bus Type** PC/104
- **I/O Connectors** 2 x 20-pin box header
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Power Consumption** Typical: 5 V @ 180 mA
  Max.: 5 V @ 400 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -40 ~ 85°C (-40 ~ 185°F)

Ordering Information

- **PCM-3718H** 100 kS/s, 12-bit Multi. PC/104 Module
- **PCM-3718HG** 100 kS/s, 12-bit High-gain Multi. PC/104 Module
- **PCM-3718HO** 100 kS/s, 12-bit Multi. PC/104 Module w/AO

Accessories

- **ADAM-3920** 20-pin DIN-rail Flat Cable Wiring Board
- **PCL-10120-1E** 20-pin Flat Cable, 1 m
- **PCL-10120-2E** 20-pin Flat Cable, 2 m

Features

- Compact size with robust design
- 48 TTL digital I/O lines
- Output status read-back
- Channels simulate 8255 PPI mode 0
- Interrupt triggering, rising/falling edge

Specifications

Digital Input

- **Channels** 48 (shared with output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.
- **Interrupt Capable Ch.** 2

Digital Output

- **Channels** 48 (shared with input)
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.5 V max. @ 6 mA
  Logic 1: 2.0 V min. @ 6 mA

General

- **Bus Type** PC/104
- **I/O Connectors** 2 x 50-pin box header
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Power Consumption** 5 V @ 90 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -40 ~ 85°C (-40 ~ 185°F)
- **Storage Humidity** 0 ~90% RH, non-condensing

Ordering Information

- **PCM-3724** 48-ch Digital I/O PC/104 Module w/ 50-pin Cable

Accessories

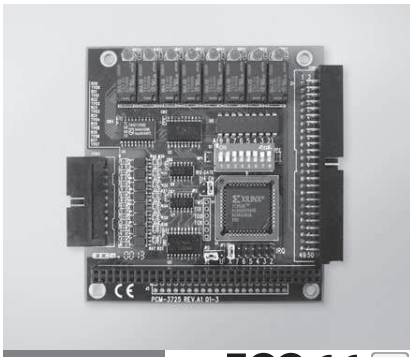
- **ADAM-3950** 50-pin DIN-rail Flat Cable Wiring Board
- **PCLD-782B** 24-ch IDI Board w/ 20-pin & 50-pin Flat Cables
- **PCLD-785B** 24-ch Relay Board w/ 20-pin & 50-pin Flat Cables
- **PCL-10150-1.2E** 50-pin Flat Cable, 1.2 m

PCM-3725
PCM-3730
PCM-3780

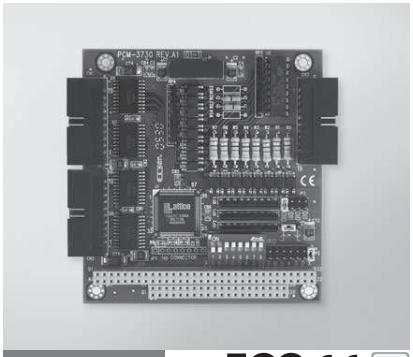
8-ch Relay and Isolated Digital Input PC/104 Module

16-ch Isolated Digital I/O PC/104 Module

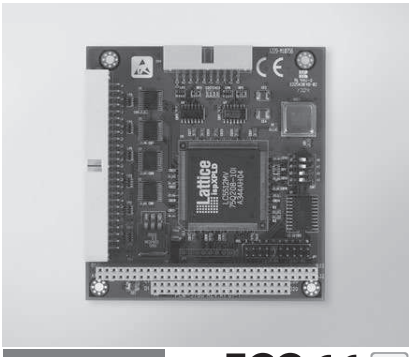
2-ch Counter/Timer with 24-ch Digital I/O PC/104 Module



PCM-3725



PCM-3730



PCM-3780

Specifications

Isolated Digital Input

- **Channels** 8
- **Input Voltage** Logic 0: 3 V
Logic 1: 10 V (50 V max.)
- **Isolation Protection** 2,500 V_{DC}
- **Overvoltage Protection** 70 V_{DC}
- **Opto-Isolator Response** 25 µs
- **Input Resistance** 4.7 KΩ

Relay Output

- **Channels** 8
- **Relay Type** SPDT (Form C)
- **Contact Rating** 30 V_{DC} @ 1.5 A
- **Relay on Time** 4 ms
- **Relay off Time** 4 ms
- **Life Span** 100,000 min @ 2 A/30 V
- **Resistance** Contact: 100 mΩ
Insulation: 1 GΩ @ 500 V_{DC}

General

- **Bus Type** PC/104
- **I/O Connectors** 1 x 20-pin head for IDI
1 x 50-pin head for relay
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Power Consumption** Typical: 5 V @ 100 mA
Max.: 5 V @ 280 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH, non-cond.

Ordering Information

- **PCM-3725** 8-ch Relay/Isolated Digital Input PC/104 Module

Accessories

- **PCL-10120-1E** 20-pin Flat Cable, 1 m
- **PCL-10120-2E** 20-pin Flat Cable, 2 m
- **PCL-10150-1.2E** 50-pin Flat Cable, 1.2 m
- **ADAM-3920** 20-pin DIN-rail Flat Cable Wiring Board
- **ADAM-3950** 50-pin DIN-rail Flat Cable Wiring Board

Specifications

Digital Input

- **Channels** 16, 5 V/TTL
- **Interrupt Capable Ch.** 4

Isolated Digital Input

- **Channels** 8
- **Input Voltage** Logic 0: 2 V max.
Logic 1: 5 V min. (24 V max.)
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 0.1 ms
- **Input Resistance** 2 kΩ @ 0.5 W

Digital Output

- **Channels** 16, 5 V/TTL
- **Output Capability** Sink: 0.5 V max. @ 8 mA
Source: 2.4 V min @ 0.4 mA

Isolated Digital Output

- **Channels** 8
- **Output Type** Sink (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 200 mA max./channel
- **Opto-Isolator Response** 100 µs

General

- **Bus Type** PC/104
- **I/O Connectors** 3 x 20-pin box header
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Power Consumption** Typical: 5 V @ 330 mA
Max.: 5 V @ 500 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH, non-cond.

Ordering Information

- **PCM-3730** 16-ch Isolated DI/O PC/104 Module w/ 20p Cable

Accessories

- **PCL-10120-1E** 20-pin Flat Cable, 1 m
- **PCL-10120-2E** 20-pin Flat Cable, 2 m
- **ADAM-3920** 20-pin DIN-rail Flat Cable Wiring Board
- **PCLD-785** 16-ch Relay Board w/ One 1m 20-pin Flat Cable
- **PCLD-885** 16-ch Power Relay Board w/ 20p & 50p Flat Cables

Specifications

Digital Input

- **Channels** 24 (shared with output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
Logic 1: 2.4 V min.
- **Interrupt Capable Ch.** 24

Digital Output

- **Channels** 24 (shared with input)
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.5 V max. @ 24 mA (sink)
Logic 1: 2.4 V min. @ 15 mA (source)

Counter/Timer

- **Channels** 2
- **Resolution** 16 bits
- **Compatibility** 5 V/TTL
- **Max. Input Frequency** 20 MHz
- **Counter Modes** 12 (programmable)
- **Interrupt Capable Ch.** 2

General

- **Bus Type** PC/104
- **I/O Connectors** 1 x 50-pin box header
1 x 20-pin box header
- **Dimensions (L x H)** 96 x 90 mm (3.8" x 3.5")
- **Power Consumption** Typical: 5 V @ 300 mA
Max.: 5 V @ 0.8 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Operating Humidity** 5 ~ 85% RH non-cond.

Ordering Information

- **PCM-3780** 2-ch Counter/Timer, DI/O, PC/104 Module w/Cables

Accessories

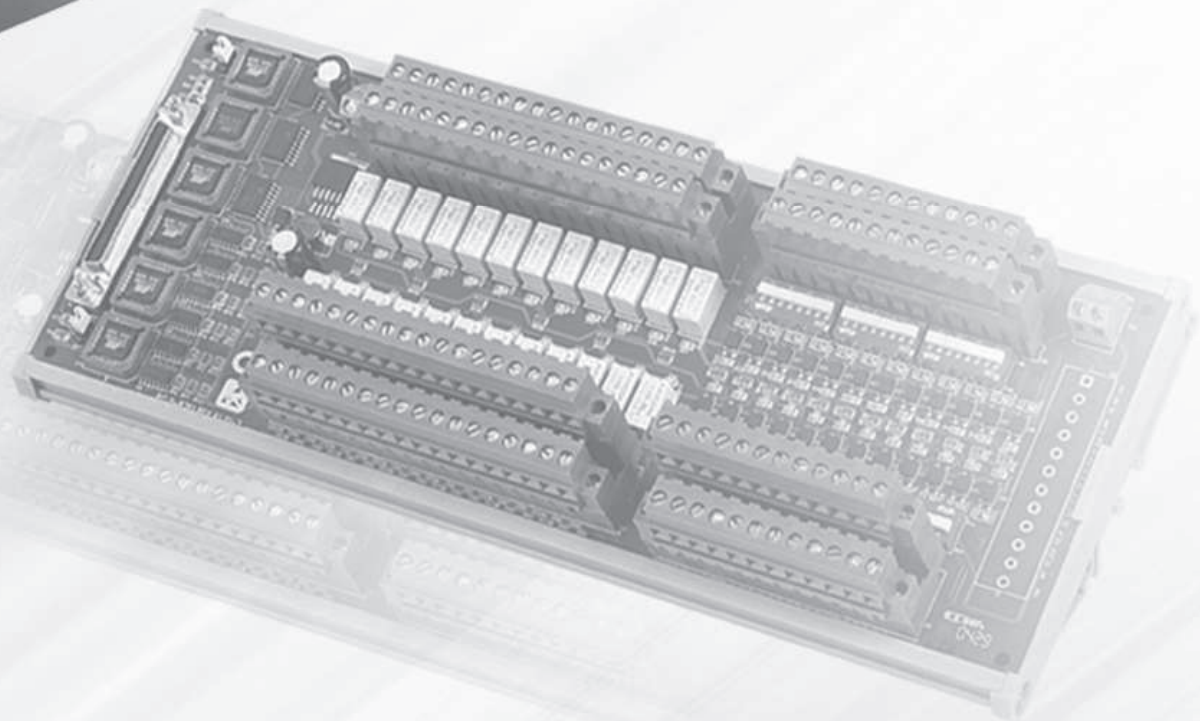
- **PCL-10120-1E** 20-pin Flat Cable, 1 m
- **PCL-10150-1.2E** 50-pin Flat Cable, 1.2 m
- **ADAM-3920** 20-pin DIN-rail Flat Cable Wiring Board
- **ADAM-3950** 50-pin DIN-rail Flat Cable Wiring Board

20

Signal Conditioning Modules and Terminal Boards

Isolated Signal Conditioning Modules		
ADAM-3000 Series	Isolated Signal Conditioning Modules	*20-3*
ADAM-3011 **ADAM-3013** **ADAM-3014**	Isolated Thermocouple Input Module Isolated RTD Input Module Isolated DC Input/Output Module	*20-4*
ADAM-3016 **ADAM-3112** **ADAM-3114**	Isolated Strain Gauge Input Module Isolated AC Voltage Input Module Isolated AC Current Input Module	*20-5*
Terminal Board Selection Guide		*20-6*
Isolated Digital I/O Terminal Boards		
ADAM-3854 **ADAM-3864**	4-ch Power Relay Module 4-ch Solid State Digital I/O Module Carrier Backplane	*20-8*
I/O Wiring Terminal Boards		
PCLD-782/B **PCLD-785/B** **PCLD-885**	16/24-ch Opto-Isolated Digital Input Board 16/24-ch Relay Board 16-ch Power Relay Board	*20-9*
PCLD-8751 **PCLD-8761** **PCLD-8762**	48-ch Opto-Isolated Digital Input Board 24-ch Opto-Isolated DI and 24-ch Relay Output Board 48-ch Relay Output Board	*20-10*
PCLD-786 **PCLD-7216**	8-ch SSR I/O Module Carrier Board 16-ch SSR I/O Module Carrier Board	*20-11*
PCLD-8710 **PCLD-8712**	DIN-rail Wiring Terminal Board with CJC Circuit DIN-rail Wiring Terminal for PCI-1712/L	*20-12*
PCLD-788	16-ch Relay Multiplexer Board	*20-13*
PCLD-789D	Amplifier and Multiplexer Board	*20-14*

To view all of Advantech's Signal Conditioning Modules and Terminal Boards, please visit www.advantech.com/products.



ADAM-3000 Series

Features

- 1,000 V_{DC} three-way isolation
- Easy input/output range configuration
- Flexible DIN-rail mounting
- Linearized thermocouple/RTD measurement
- Low power consumption
- Wide input bandwidth

Introduction

The ADAM-3000 Series consist of the most cost-efficient, field configurable, isolation-based, signal conditioners on the market today. The modules are easily installed to protect your instruments and process signals from the harmful effects of ground loops, motor noise, and other electrical interferences.

Affordable Signal Isolation Solution

Featuring optical isolation technology, the ADAM-3000 modules provide three-way (input/output/power) 1,000 V_{DC} isolation. Optical isolation provides pin-point accuracy and stability over a wide range of operations at minimal power consumption.

Flexible Analog Data Conversion

The input/output range for the ADAM-3000 modules can be configured through switches located inside the module. The modules accept voltage, current, thermocouple or RTD as input, and pass voltage or current as output.

Thermocouple input is handled by the built-in input thermocouple linearization circuitry and a cold junction compensation function. These ensure accurate temperature measurement and accurate conversion of this information to the voltage or current output.

Configuration

The ADAM-3000 modules use 24 V_{DC} power. This electrical power wiring can be acquired from adjacent modules, which greatly simplifies wiring and maintenance. The I/O configuration switches are located inside the modules. To reach the switches, simply remove the modules from the DIN-rail bracket by sliding the modules downward.

Modular Industrial Design

The ADAM-3000 modules can be easily mounted on a DIN-rail, and signal wires can be connected through screw terminals. The screw terminals and input/output configuration switches are built inside the industrial grade plastic casing. With simple two-wire input/output cables, wiring is easy and reliable in harsh industrial environments.

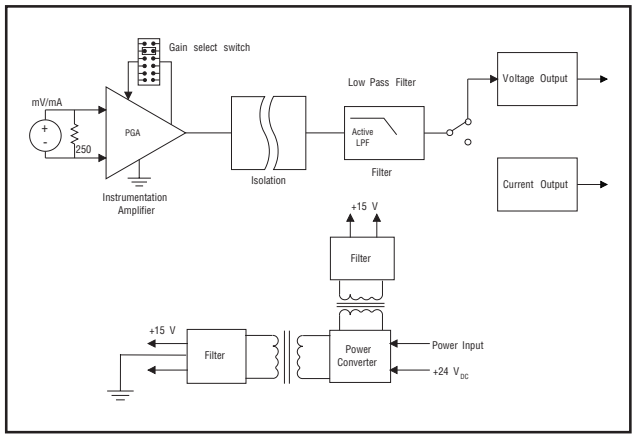
Applications

- Signal isolation
- Signal transmitters
- Thermocouple/RTD/strain gauge measurements
- Signal amplifiers
- Noise filter

Common Specifications

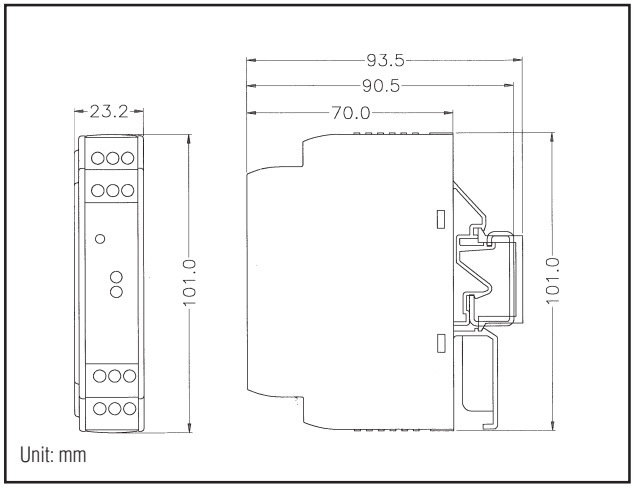
Isolation	1,000 V_{DC}
Indicators	Power LED indicator
Power Requirement	24 V_{DC} ± 10%
Case	ABS
Screw Terminal	Accepts 0.5 mm^2 ~ 2.5 mm^2 1- #12 or 2- #14 ~ #22 AWG
Operating Temperature	0 ~ 70°C (32 ~ 158°F) (ADAM-3011: 0 ~ 50°C (32 ~ 122°F))
Storage Temperature	-25 ~ 85°C (-13 ~ 185°F)

Block Diagram



Block Diagram of ADAM-3014

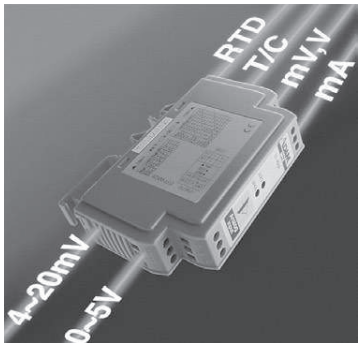
Dimensions



ADAM-3000 Series Modules

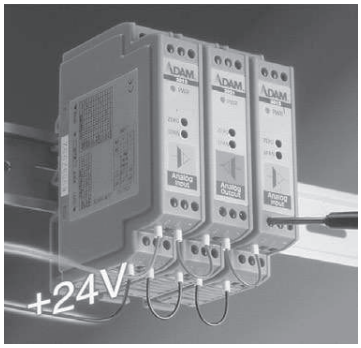
Three-way Signal Isolation

Three-way (input/output/power) 1,000 V_{DC} isolation.



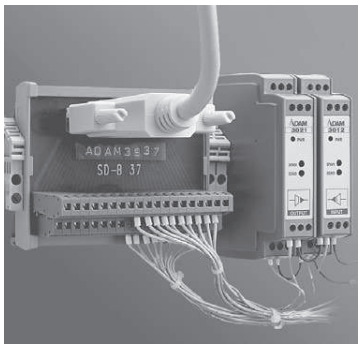
Field Configurable I/O Range

The I/O range can be configured on site with switches inside the module.



Easy Daisy Chain Power Wiring

Power can be connected conveniently from adjacent modules.



Interfacing to DAQ Cards

A wiring adapter can connect modules to a data acquisition card.

ADAM-3011
ADAM-3013
ADAM-3014

Isolated Thermocouple Input Module

Isolated RTD Input Module

Isolated DC Input/Output Module

ADAM-3011

ADAM-3013

ADAM-3014

Specifications

Thermocouple Input

- **Common Mode Rejection** 115 dB min
- **Input Type**

T/C type	Temperature Range (°C)	Accuracy at 25°C (°C)
J	-40 ~ 760	±2
K	0 ~ 1,000	±2
T	-100 ~ 400	±2
E	0 ~ 1,000	±2
S	500 ~ 1,750	±4
R	500 ~ 1,750	±4
B	500 ~ 1,800	±4

- **Isolation** 1,000 V_{DC} (Three-way)
- **Output Impedance** 0.5 Ω
- **Stability (Temperature Drift)** ±2°C
- **Voltage Output** 0 ~ 10 V

General

- **Connectors** Screw terminal
- **Enclosure** ABS
- **Indicators** Power LED indicator
- **Isolation** 1,000 V_{DC}
- **Power Consumption** 1.4 W
- **Power Input** 24 V_{DC} ± 10%
- **Operating Temperature** 0 ~ 50°C (32 ~ 122°F)
- **Storage Temperature** -25 ~ 85°C (-13 ~ 185°F)

Ordering Information

- **ADAM-3011** Isolated Thermocouple Input Module

Specifications

RTD Input

- **Accuracy** ± 0.1% of full range (voltage) or +/- 0.15°C (voltage)
  ± 0.2% of full range (current)
- **Bandwidth** 4 Hz
- **Input CMR at DC** 92 dB min.
- **Input Connections** 2, 3 or 4 wires
- **Input Type**

RTD type	α	Temperature Range (°C)
Pt	0.00385	-100 ~ 100
Pt	0.00385	0 ~ 100
Pt	0.00385	0 ~ 200
Pt	0.00385	0 ~ 600
Pt	0.00385	-100 ~ 0
Pt	0.00385	-100 ~ 200
Pt	0.00385	-50 ~ 50
Pt	0.00385	-50 ~ 150
Pt	0.00392	-100 ~ 100
Pt	0.00392	0 ~ 100
Pt	0.00392	0 ~ 200
Pt	0.00392	0 ~ 600
Ni	N/A	0 ~ 100
Ni	N/A	-80 ~ 100

- **Output Range** 0 ~ 5 V, 0 ~ 10 V, 0 ~ 20 mA
- **Output Resistance** < 5 Ω
- **Temperature Drift** ± 30 ppm of full range

General

- **Connectors** Screw terminal
- **Enclosure** ABS
- **Indicators** Power LED indicator
- **Isolation** 1,000 V_{DC}
- **Power Consumption** < 0.95 W
- **Power Input** 24 V_{DC} ±10%
- **Operating Temperature** 0 ~ 70°C (32 ~ 158°F)
- **Storage Temperature** -25 ~ 85°C (-13 ~ 185°F)

Ordering Information

- **ADAM-3013** Isolated RTD Input Module

Specifications

I/O

- **Accuracy** ±0.1% of full range (typical)
- **Common Mode Rejection** > 100 dB @ 50 Hz/60 Hz
- **Current Input** Bipolar: ±20 mA
  Unipolar: 0 ~ 20 mA
  Input impedance: 250 Ω
- **Current Output** 0 ~ 20 mA
- **Stability (Temperature Drift)** 150 ppm (typical)
- **Voltage Input** Bipolar input:
  ±10 mV, ±50 mV, ±100 mV, ±0.5 V, ±1.0 V, ±5 V, ±10 V
  Unipolar input:
  0 ~ 10 mV, 0 ~ 50 mV, 0 ~ 100 mV, 0 ~ 0.5 V, 0 ~ 1 V, 0 ~ 5 V, 0 ~ 10 V
  Input impedance: 2 MΩ
  Input bandwidth: 2.4 kHz (typical)
- **Voltage Output** Bipolar: ±5 V, ±10 V
  Unipolar: 0 ~ 10 V
  Impedance: < 50 Ω
  Drive: 10 mA max.

General

- **Connectors** Screw terminal
- **Enclosure** ABS
- **Indicators** Power LED indicator
- **Isolation (Three-way)** 1,000 V_{DC}
- **Power Consumption** 0.85 W (voltage output)
  1.2 W (current output)
- **Power Input** 24 V_{DC} ±10%
- **Operating Temperature** -10 ~ 70°C (14 ~ 158°F)
- **Storage Temperature** -25 ~ 85°C (-13 ~ 185°F)

Ordering Information

- **ADAM-3014** Isolated DC Input/Output Module

ADAM-3016
ADAM-3112
ADAM-3114

Isolated Strain Gauge Input Module

Isolated AC Voltage Input Module

Isolated AC Current Input Module

ADAM-3016

ADAM-3112

ADAM-3114

Specifications

I/O

- **Accuracy** ±0.1% of full range
- **Bandwidth** 2.4 kHz (typical)
- **Isolation Mode Rejection** >100 dB @ 50 Hz/60 Hz
- **Current Output** Current: 0 ~ 20 mA
  Current load resistor: 0 ~ 500 Ω (Source)
- **Stability (Temperature Drift)** 150 ppm (typical)
- **Voltage Specifications** Electrical input: ±10 mV, ±20 mV, ±30 mV, ±100 mV
  Excitation voltage: 1 ~ 10 V_{DC} (60 mA max)
- **Voltage Output** Bipolar: ±5 V, ±10 V
  Unipolar: 0 ~ 10 V
  Impedance: < 50 Ω

General

- **Connectors** Screw terminal
- **Enclosure** ABS
- **Indicators** Power LED indicator
- **Isolation** 1,000 V_{DC} (Three-way)
- **Power Consumption** ≤ 1.85 W (voltage output)
  ≤ 2.15 W (current output)
- **Power Input** 24 V_{DC} ±10%
- **Operating Temperature** -10 ~ 70°C (14 ~ 158°F)
- **Storage Temperature** -25 ~ 85°C (-13 ~ 185°F)

Ordering Information

- **ADAM-3016** Isolated Strain Gauge Input Module

Specifications

Voltage Input

Full Range Mode		400 V	250 V	120 V
Input Voltage	AC (V_{RMS})	0 ~ 400	0 ~ 250	0 ~ 120
	DC (V)	0 ~ 400	0 ~ 250	0 ~ 120
Input Impedance		48 k	30 k	14.4 k

Voltage Output

- **Output Signal** 0 ~ 5 V_{DC}
- **Accuracy** < ±1.0 % for full range
- **Output Impedance** < 10 Ω @ operating frequency <60 Hz
- **Load** > 10 kΩ
- **Ripple** < 120mVp-p
- **Temperature Coefficient** 400 ppm/°C
- **Input Bandwidth** 6 kHz

Power Consumption

- **Supply Voltage** 24 V_{DC} ± 10 %
- **Current Consumption** 40 mA

General

- **Isolation Protection** 1,000 V_{DC} (output to power)
  2,500 V_{RMS} (input to output, input to power)
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95 %

Ordering Information

- **ADAM-3112** Isolated AC Voltage Input Module

Specifications

Current Input

- **AC Current Input** 0 ~ 5 A_{RMS}
- **DC Current Input** 0 ~ 5 A

Voltage Output

- **Output Signal** 0 ~ 5 V_{DC}
- **Accuracy** < ±1.0 % for full range
- **Output Impedance** <10 Ω @ operating frequency <60 Hz
- **Load** > 10 kΩ
- **Ripple** < 120 mVp-p
- **Temperature Coefficient** 400 ppm/°C
- **Input Bandwidth** 10 kHz

Power Consumption

- **Supply Voltage** 24 V_{DC} ± 10 %
- **Current Consumption** 40 mA

General

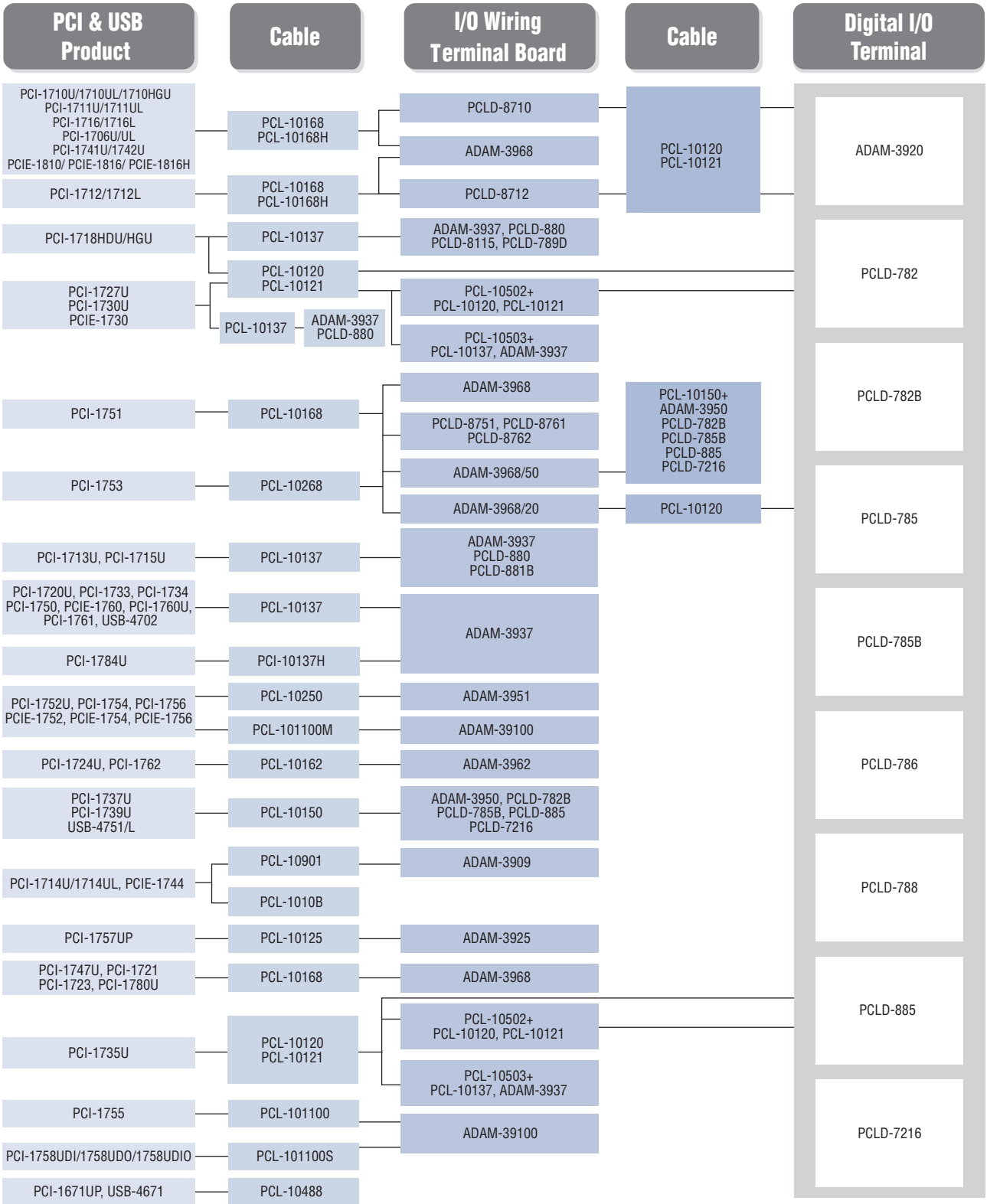
- **Isolation Protection** 1,000 V_{DC} (output to power)
  2,500 V_{RMS} (input to output, input to power)
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95 %

Ordering Information

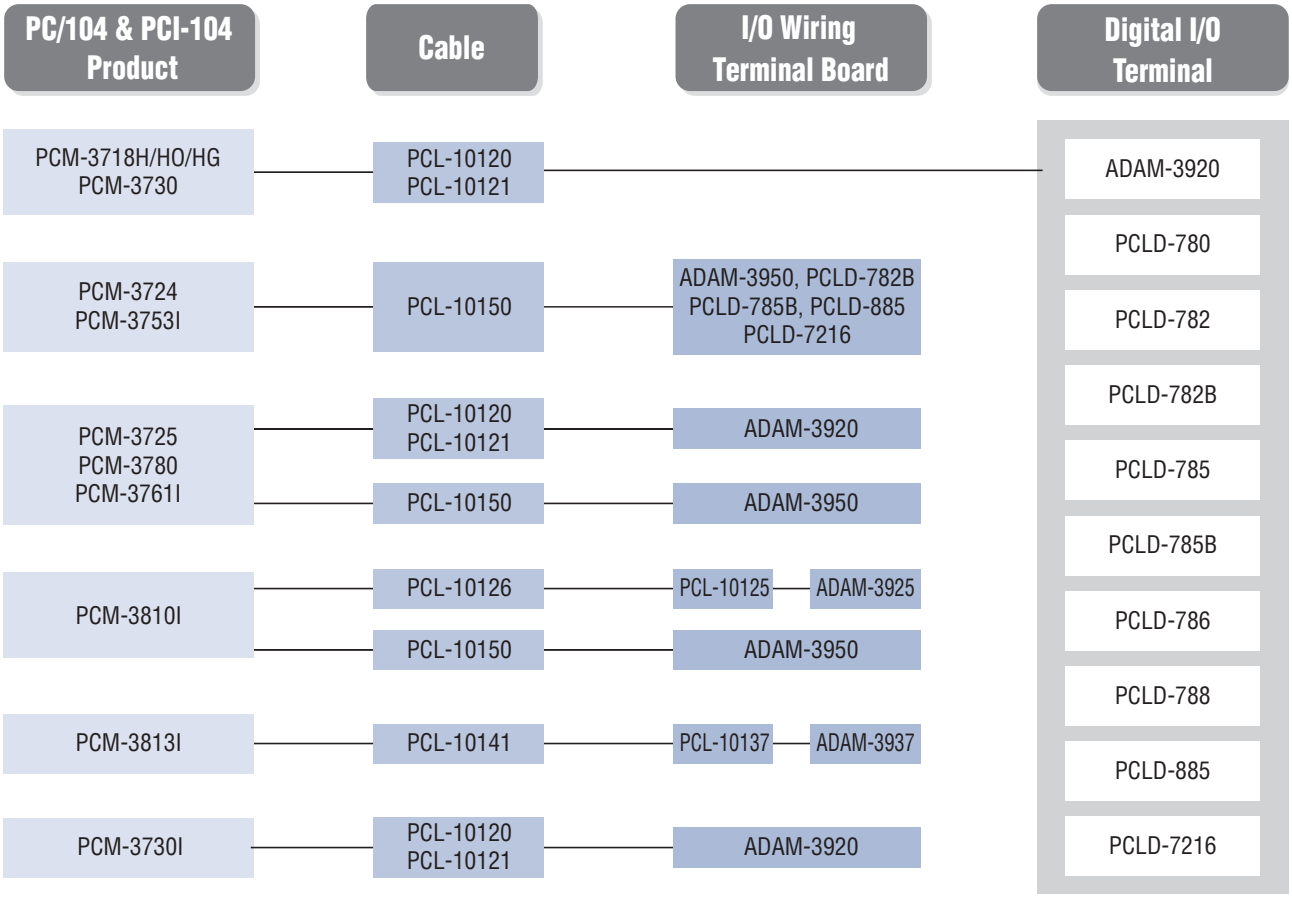
- **ADAM-3114** Isolated AC Current Input Module

Terminal Board Selection Guide

Recommended Cables, I/O Wiring Terminal Boards and Isolated Digital I/O Terminals for Connecting to PCI & USB Data Acquisition (DAQ) Products



Recommended Cables, I/O Wiring Terminal Boards and Isolated Digital I/O Terminals for Connecting to PC/104 & PCI-104 Data Acquisition (DAQ) Products



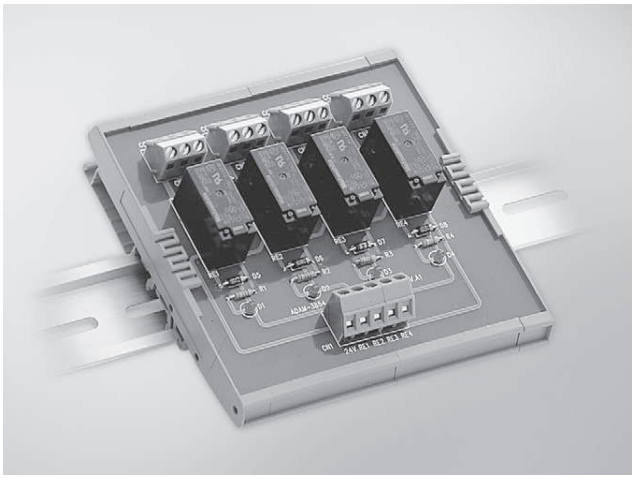
Cable Accessories

Model	Description
PCL-1010B-1E	BNC to BNC Wiring Cable, 1 m
PCL-101100-1E	100-pin SCSI High-Speed Cable, 1 m
PCL-101100S-1E	100-pin Mini-SCSI Cable, 1 m
PCL-101100S-2E	100-pin Mini-SCSI Cable, 2 m
PCL-101100S-3E	100-pin Mini-SCSI Cable, 3 m
PCL-101100M-3E	100-pin SCSI Shielded Cable, 3 m
PCL-10120-0.4E	20-pin Flat Cable, 0.4 m
PCL-10120-1E	20-pin Flat Cable, 1 m
PCL-10120-2E	20-pin Flat Cable, 2 m
PCL-10121-2E	20-pin Shielded Cable, 2 m
PCL-10125-1E	DB25 Cable, 1 m
PCL-10125-3E	DB25 Cable, 3 m
PCL-10126-0.2E	IDE#2 26-pin to DB25(F) Flat CABLE, 0.2m
PCL-10137-1E	DB37 Cable, 1 m
PCL-10137-2E	DB37 Cable, 2 m
PCL-10137-3E	DB37 Cable, 3 m
PCL-10137H-1E	DB37 High-Speed Cable, 1 m

Model	Description
PCL-10137H-3E	DB37 High-Speed Cable, 3 m
PCL-10141-0.2E	IDE#2 40-pin to DB37(F) Flat CABLE, 0.2m
PCL-10150-1.2E	50-pin Flat Cable, 1.2 m
PCL-10162-1E	DB62 Cable, 1 m
PCL-10162-3E	DB62 Cable, 3 m
PCL-10168-1E	68-pin SCSI Shielded Cable, 1 m
PCL-10168-2E	68-pin SCSI Shielded Cable, 2 m
PCL-10168H-1E	68-pin SCSI Shielded Cable with Noise Rejecting, 1m
PCL-10168H-2E	68-pin SCSI Shielded Cable with Noise Rejecting, 2m
PCL-10250-1E	100-pin SCSI to Two 50-pin SCSI Cable, 1 m
PCL-10250-2E	100-pin SCSI to Two 50-pin SCSI Cable, 2 m
PCL-10268-1E	100-pin SCSI to Two 68-pin SCSI Cables, 1 m
PCL-10268-2E	100-pin SCSI to Two 68-pin SCSI Cables, 2 m
PCL-10488-2	IEEE-488 Cable, 2 m
PCL-10502-AE	Extender, Extend Dual 20-pin to PC Slot-Plate
PCL-10503-AE	Adapter Dual 20-pin to DB37
PCL-10901-3E	DB9 to PS/2 Cable, 3 m

ADAM-3854
ADAM-3864

4-ch Power Relay Module
4-ch Solid State Digital I/O Module Carrier Backplane



ADAM-3854

Features

- High power relays can handle up to 5 A @ 250 V_{AC} and 5 A @ 30 V_{DC}
- 4 single-pole double-throw (SPDT) relays
- Industrial screw terminals for easy output wiring
- LED status indicators
- Onboard varistor protects relay contact points
- DIN-rail mounting

Specifications

I/O

- **Channels** 4
- **Contact Rating** 250 V_{AC} @ 5 A
30 V_{DC} @ 5 A
- **Contact Resistance** 100 mΩ
- **Operation Time** 15 ms max.
- **Relay Type** SPDT (Form C)
- **Release Time** 5 ms max.
- **Life Expectancy** 1.7 x 10^5 at rated load

Varistor

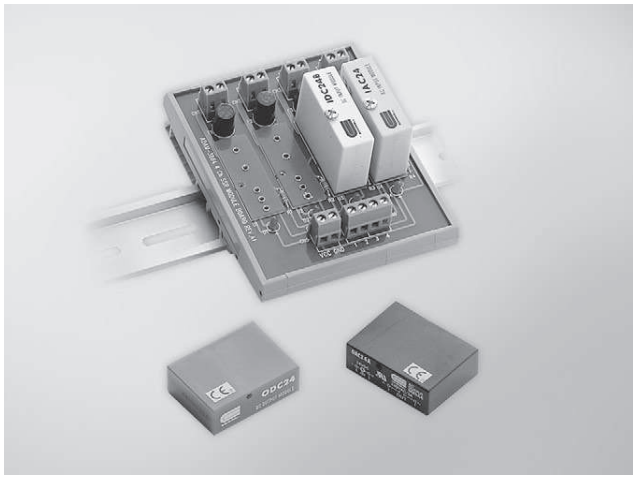
- **Clamping Voltage** 760 V (10 A)
- **Max. Applied Voltage** 300 V_{RMS}
- **Max. Peak Current** 1,200 A for 8 ms
- **Varistor Voltage** 470 V (current = 1 mA)

General

- **Connectors** Screw terminals
- **Dimensions (L x W x H)** 112.5 x 118.4 x 46 mm (4.43" x 4.66" x 1.81")
- **LED Indicators** Status displayed for each relay
- **Mounting** DIN-rail
- **Power Consumption** 2.2 W
- **Power Input** 24 V_{DC}

Ordering Information

- **ADAM-3854** 4-ch DIN-rail Power Relay Module



ADAM-3864

Features

- 2,500 V_{RMS} optical isolation
- LED status indicators
- Onboard fuse protection
- DIN-rail mounting

Specifications

Input Modules

Field Side:

- **Input On/Off Voltage** IAC24A series: 180 ~ 280 V/80 V_{RMS}
Range IDC24B series: 3 ~ 32 V/1 V_{DC}
- **Input Resistance** IAC24A series: 44 kΩ
IDC24B series: 1.5 kΩ

Logic Side:

- **Breakdown Voltage** 30 V_{DC}
- **Output Current** 100 mA max.
- **Output Voltage Drop** 0.4 V max.
- **Supply Current** 12 mA max.
- **Supply Voltage** 24 V_{DC}

Output Modules

Field Side:

- **Contact Voltage Drop** 1.6 V max.
- **Current Rating** 3 A max. (@ 25°C)

Logic Side:

- **Input Resistance** 220 Ω
- **Supply Current** 12 mA max.
- **Supply Voltage** 24 V

General

- **Dimensions (L x H x W)** 118.4 x 90 x 59 mm (4.66" x 3.54" x 2.32")
- **Mounting** DIN-rail

Ordering Information

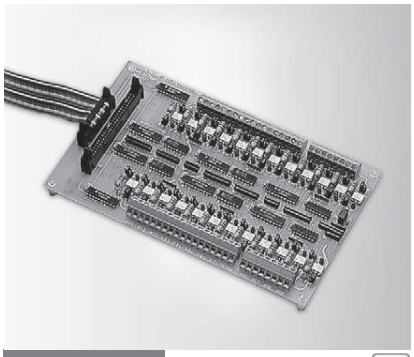
- **ADAM-3864** 4-ch Solid State Module Carrier Backplane
- **OAC24A** AC Output Module (24-280 V_{AC}, 3 A)
- **ODC24** DC Output Module (5-60 V_{DC}, 3 A)
- **PCLM-ODC5** Single Piece DC SSR Module (60 V_{DC}, 3 A)
- **IAC24A** AC Input Module (180-280 V_{AC})
- **IDC24B** DC Input Module (3-32 V_{DC})

PCLD-782/B
PCLD-785/B
PCLD-885

16/24-ch Opto-Isolated Digital Input Board

16/24-ch Relay Board

16-ch Power Relay Board



PCLD-782/B

Features

- Compatible with all PC-LabCard™ products with DI channels on either 20-pin flat cable or 50-pin Opto-22 compatible connectors
- 16 or 24 optically-isolated digital input channels
- Built-in screw terminals for easy input wiring
- LEDs indicate input logic status
- Inputs buffered with voltage comparators

Specifications

Isolated Digital Input

- **Channels**: PCLD-782: 16; PCLD-782B: 24
- **Input Range**: 0 ~ 24 V_{DC}
- **Input Resistance**: 560 Ω
- **Isolation Voltages**: 1,500 V_{DC} min.
- **Threshold Voltage**: 1.5 V_{DC} (VR adjustable)

General

- **DI Connectors**: Screw terminals (#12 ~ 22 AWG)
- **Controller Connector**: PCLD-782: 1 x 20-pin box header (CN1); PCLD-782B: 1 x 20-pin box header (CN1) and 1 x 50-pin box header (CN2)
- **Dimensions (L x W)**: PCLD-782: 3U– 205 x 114 mm (8.1" x 4.5"); PCLD-782B: 4U– 220 x 132 mm (8.7" x 5.2")
- **LED Indicators**: Indicates input logic status
- **Mounting**: 4 x screw holes for flat surface mounting

Ordering Information

- **PCLD-782**: 16-ch Isolated DI Board w/ 1m 20-pin Flat Cable
- **PCLD-782B**: 24-ch IDI Board w/ 20-pin & 50-pin Flat Cables

Accessories

- **PCL-10120-1E**: 20-pin Flat Cable, 1 m
- **PCL-10120-2E**: 20-pin Flat Cable, 2 m
- **PCL-10150-1.2E**: 50-pin Flat Cable, 1.2 m

PCLD-785/B

Features

- Compatible with PC-LabCard™ products with 20-pin digital output connector and 50-pin Opto-22 digital output connector (PCLD-785B only)
- Automatic selection of control logic (PLCD-785B only): Negative logic for the Opto-22 connector Positive logic for the 20-pin flat cable connector
- Screw terminals for easy output wiring
- LED status indicators

Specifications

Relay

- **Channels**: PCLD-785: 16 (CN1, 20-pin conn.); PCLD-785B: 16 (CN1, 20-pin conn.) 24 (CN2, 50-pin conn.)
- **Contact Ratings**: 120 V_{AC} @ 0.5 A, 30 V_{DC} @ 1 A
- **Contact Resistance**: < 100 mΩ
- **Operation Time**: 5 ms max.
- **Insulation Resist.**: 100 MΩ
- **Life Expectancy**: 5 x 10^5 @ 110 V_{AC} /0.3 A; 5 x 10^5 @ 24 V_{DC} /1.25 A
- **Relay Type**: SPDT (Single-Pole Double-Throw) Form C
- **Release Time**: 5 ms max.

General

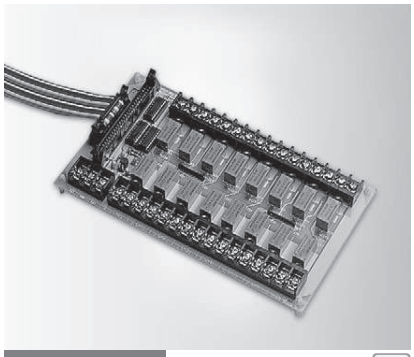
- **Dimensions (L x W)**: PCLD-785: 114x220 mm; PCLD-785B: 132x220 mm
- **Power Consumption**: 5 V @ < 100 mA; 12 V @ 33 mA for each relay
- **Power Input**: 20-pin connector: 5 V_{DC}: Jumper select PC bus or external supply; 12 V_{DC}: Jumper select PC bus or external supply; 50-pin connector: external 12 V supply

Ordering Information

- **PCLD-785**: 16-ch Relay Board w/ One 1m 20-pin Flat Cable
- **PCLD-785B**: 24-ch Relay Board w/ 20-pin & 50-pin Flat Cables

Accessories

- **PCL-10120-1E**: 20-pin Flat Cable, 1 m
- **PCL-10120-2E**: 20-pin Flat Cable, 2 m
- **PCL-10150-1.2E**: 50-pin Flat Cable, 1.2 m



PCLD-885

Features

- Accepts 20-pin or 50-pin (Opto-22 compatible) connectors
- 16 single-pole single-throw (SPST) relays
- High-power relay handles up to 6 A @ 250 V_{AC}
- Onboard varistors protect all relay contact points
- Industrial screw terminals for ease of wiring
- LED status indicators
- 5 V/ 12 V power/status LED indicator

Specifications

Relay

- **Channels**: 16
- **Contact Rating**: 250 V_{AC} @ 6 A; 30 V_{DC} @ 5 A
- **Contact Resistance**: 30 mΩ max.
- **Insulation Resist.**: 1,000 MΩ @ 500 V_{DC}
- **Life Expectancy**: >100,000 cycles at rated load
- **Relay On Time**: 6 ms max.
- **Relay Off Time**: 3 ms max.
- **Relay Type**: SPST (Form A), normally open

Varister

- **Clamping Voltage**: 760 V (10 A)
- **Max. Peak Current**: 1,200 A for 8 msec.
- **Max. Applied Voltage**: 300 V_{RMS} AC continuous
- **Varistor Voltage**: 470 V (current = 1 mA)

General

- **Power Consumption**: 12 V @ 22 mA for each relay, 352 mA if all relays energized; 5 V @ 200 mA max.
- **Connectors**: Input: 20-pin flat cable or 50-pin Opto-22 compatible; Output: Barrier strip screw terminal
- **Dimensions (L x W)**: 205 x 114 mm (8" x 4.5")
- **Operating Temp.**: 0 ~ 60°C (32 ~ 140°F)

Ordering Information

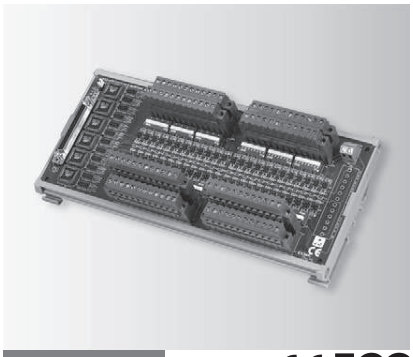
- **PCLD-885**: 16-ch Power Relay Board w/ 20p & 50p Flat Cables

PCLD-8751
PCLD-8761
PCLD-8762

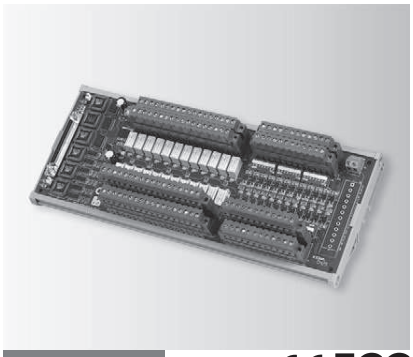
48-ch Opto-Isolated Digital Input Board

24-ch Opto-Isolated DI and 24-ch Relay Output Board

48-ch Relay Output Board



PCLD-8751 CE FCC



PCLD-8761 CE FCC

PCLD-8762 CE FCC

Features

- 48 optically-isolated digital input channels
- Built-in plug-in screw terminals for easier wiring
- LEDs indicate input logic status
- Input buffered with voltage comparators
- Wet/Dry contact set by DIP switches
- Input logic set by jumper
- Wide input range from 5 to 30 V

Specifications

Digital Input

- **Channels** 48 isolated digital inputs
- **Contact Mode** Wet contact
Dry contact (set by switch)
- **Isolation Voltage** 3,500 V
- **Logic Modes** Positive Logic
Negative Logic
(set by jumper)
- **Signal Voltage** 0 ~ 30 V
VIH (MIN) : 4 V,
VIL (MAX) : 1 V

General

- **Certification** CE, FCC
- **Connectors** Cable: SCSI-68 pin
Signals: Plug-in screw terminals (#14 - 24 AWG)
- **Dimensions** 255 x 121 mm
(10.04" x 4.76")
- **LED Indicators** One for each channel to indicate logic status
- **Mounting** DIN-rail

Ordering Information

- **PCLD-8751** 48-ch Opto-isolated Digital Input Board

Features

- Built-in plug-in screw terminals for easier wiring
- LED status indicators for D/I and relay output
- Digital inputs buffered with voltage comparators
- Wet/Dry contact set by DIP switches for D/I
- Wide input range from 5 to 30 V
- INT/EXT Power selection by jumper

Specifications

Digital Input

- **Channels** 24 IDI with LED
- **Contact Mode** Wet contact and dry contact for each IDI (set by switch)
- **Digital Input** 0 ~ 30 V VIH (MIN) : 4 V, VIL (MAX) : 1V
- **Isolation Voltage** 3,500 V (Isolated DI), 1,500V (Relay)
- **Logic Mode (IDI and Relay are independent)** Positive Logic
Negative Logic
(set by jumper)

Relay Output

- **Channels** 24 SPDT (Form C)
- **Contact Rating** 30 V_{DC} @ 1 A,
120 V_{AC} @ 0.5 A
- **Contact Resistance** 100 mΩ
- **Electrical Endurance** 5 x 10^7 times at 12 V/10 mA
- **Mechanical Endurance** 10^8 times
- **Operation Time** 5 ms Max
- **Release Time** 6 ms Max

General

- **Certification** CE, FCC
- **Connectors**
Cable: SCSI-68 pin
Signals: Plug-in screw terminals (#14 - 24 AWG)
- **Dimensions** 285 x 121 mm
(11.22" x 4.76")
- **Mounting** DIN-rail
- **Power Consumption** +5 V @ < 380 mA +50*n (mA)
+12 V @ < 240 mA +70*n (mA)
(*n indicate the number of relays)
- **Power Selection** PCI Bus or External power (7 ~ 30 V) by jumper

Ordering Information

- **PCLD-8761** 24-ch Opto-isolated DI and 24-ch Relay (SPDT) Output Board

Features

- Built-in plug-in screw terminals for easier wiring
- LED status indicators for Relay output
- DIN-rail mounting
- Onboard relay driver circuits

Specifications

Relay Output

- **Channels** 48 SPDT (Form C)
- **Contact Rating** 30 V_{DC} @ 1 A,
120 V_{AC} @ 0.5 A
- **Contact Resistance** 100 mΩ
- **Electrical Endurance** 5 x 10^7 times at 12 V/10 mA
- **Mechanical Endurance** 10^8 times
- **Operation Time** 5 ms Max
- **Release Time** 6 ms Max

General

- **Certification** CE, FCC
- **Connectors**
Cable: SCSI-68 pin
Signals: Plug-in screw terminals (#14 - 24 AWG)
- **Dimensions** 285 x 117 mm
(11.22" x 4.61")
- **Mounting** DIN-rail
- **Power Input** Unregulated 7 ~ 30 V_{DC}
- **Power Consumption** 7 V @ 1.8 A,
30 V @ 0.45 A
(External power supply is required)

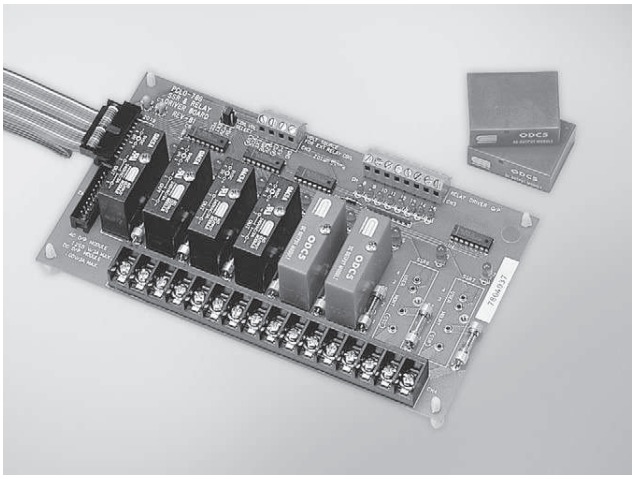
Ordering Information

- **PCLD-8762** 48-ch Relay (SPDT) Output Board

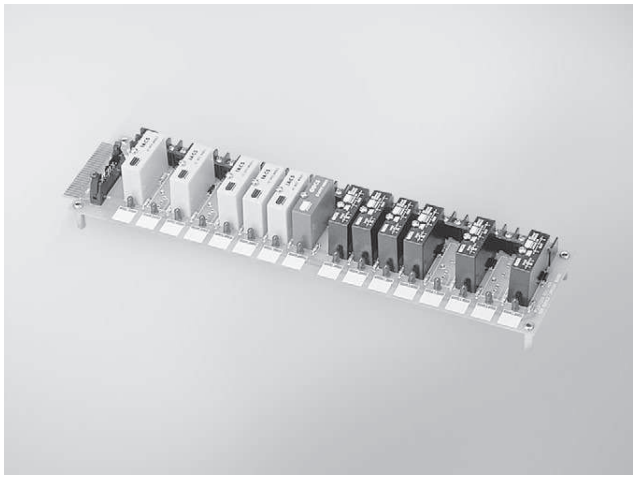
PCLD-786
PCLD-7216

8-ch SSR I/O Module Carrier Board

16-ch SSR I/O Module Carrier Board



PCL-10120-1 PCLD-786 PCLM-ODC5



PCLD-7216

Features

- Up to eight AC or DC solid state relay modules
- Photo-coupler isolated operation
- Eight external relay drivers
- LED status indicators

Specifications

AC Solid State Relays

- **1 Cycle Surge** 40 A
- **Blocking Voltage** ±600 V min.
- **Off Leakage Current** 8 mA max.
- **On-state Voltage** 1.6 V max.
- **Output Rating** 24 ~ 280 V_{AC} @ 3.0 A
- **Turn On** zero volts
- **Turn On/Turn Off Time** < ½ cycle
- **Type** PCLM-OAC5A

DC Solid State Relays

- **1 Second Surge** 5 A
- **OFF Leakage Current** 1 mA max.
- **ON-state Voltage** 1.4 V max.
- **Output Rating** 5 ~ 60 V_{DC} @ 3.0 A
- **Turn On/Turn Off Time** 750 µs max.
- **Type** PCLM-ODC5

External Relay Drivers

- **Channels** 8
- **Coil Driving Voltage** 5 V, 12 V from PC or external source
- **Driver Type** ULN2003, open collector type
- **Max. Driving Current** 125 mA each channel

General

- **Dimensions (L x W)** 205 x 114 mm (8.1" x 4.5")

Ordering Information

- **PCLD-786** 8-ch SSR I/O Module Board w/ 20-pin Flat Cable

Note: PCLD-786 does not include SSRs. They must be ordered by selecting single piece SSR modules according to your requirements.

- **PCLM-OAC5A** Single Piece AC SSR Module (280 V_{AC}, 3 A)
- **PCLM-ODC5** Single Piece DC SSR Module (60 V_{DC}, 3 A)

Features

- Channel status reflected by onboard LED for easy monitoring
- Onboard fuse protection

Specifications

Module Type		Field Side		Logic Side
Output Modules	**Part No.**	**Output Voltage Rating**	**Output Current Rating**	**Input Logic and SSR Status**
AC Output	PCLM-OAC5A	24 ~ 280 V_{AC}	3.0 A	TTL low (On)
		12 ~ 280 V_{AC}		TTL high (Off)
DC Output	PCLM-ODC5	5 ~ 60 V_{AC}	3.0 A	TTL low (On)
				TTL high (Off)
Input Modules	**Part No.**	**Input On Voltage**	**Input Off Voltage**	**Output Logic and On/Off Status**
AC Input	PCLM-IAC5A	180 ~ 280 V_{AC}	< 80 V	TTL low (On)
				TTL high (Off)
DC Input	PCLM-IDC5B	3 ~ 32 V_{AC}	< 1 V	TTL low (On)
				TTL high (Off)

Input Modules

Field Side:

- **Input On/Off Voltage Range** PCLM-IAC5: 90 ~ 140 V/45 V_{RMS}
  PCLM-IAC5A: 180 ~ 280 V/80 V_{RMS}
  PCLM-IDC5B: 3 ~ 32 V/1 V_{DC}
- **Input Resistance** PCLM-IAC5: 14 kΩ, PCLM-IAC5A: 44 kΩ,
  PCLM-IDC5B: 1.5 kΩ
- **Turn On/Off Time** PCLM-IAC5: 20 msec. max., PCLM-IAC5A: 20 msec. max.
  PCLM-IDC5B: 100 msec. max.

Logic Side:

- **Breakdown Voltage** 30 V_{DC}
- **Output Current** 100 mA max.
- **Output Voltage Drop** 0.4 V max.
- **Supply Current** 12 mA max.
- **Supply Voltage** 4 ~ 6 V

Output Modules

Field Side:

- **Current Rating** 3 A max. (@ 25°C)
- **Contact Voltage Drop** 1.6 V max.
- **Turn On/Off Time** PCLM-OAC series: ½ AC cycle max.
  PCLM-ODC series: 100 µsec/750 µsec. max.

Logic Side:

- **Input Resistance** 220 Ω
- **Supply Voltage** 4 ~ 6 V
- **Supply Current** 12 mA max.

General

- **Logic Side Connectors** 50-pin edge connector, Opto-22 compatible
- **Dimensions (L x W x H)** 367 x 111 x 56 mm (14.4" x 4.4" x 2.2")

Ordering Information

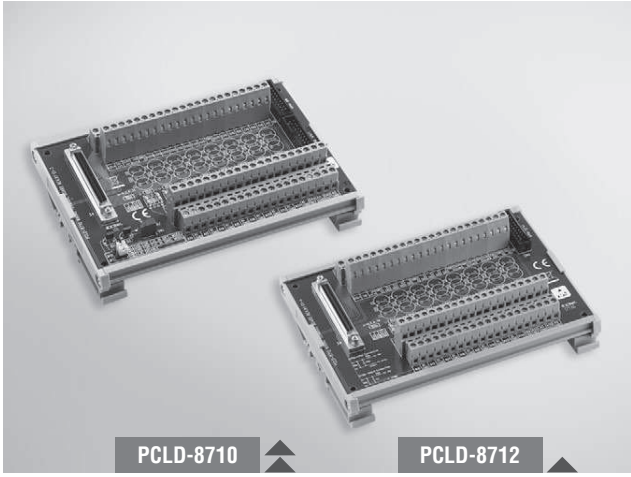
- **PCLD-7216** 16-ch SSR I/O Module Carrier Board

Note: PCLD-7216 does not include SSRs. They must be ordered by selecting single piece SSR modules according to your requirements.

PCLD-8710
PCLD-8712

DIN-rail Wiring Terminal Board with CJC Circuit

DIN-rail Wiring Terminal for PCI-1712/L



Features

- Low-cost screw-terminal with 68-pin SCSI-II connector
- Onboard CJC (Cold Junction Compensation) circuits for direct thermocouple measurement (PCLD-8710)
- Reserved space for signal-conditioning circuits such as low-pass filter, voltage attenuator and current shunt
- Industrial-grade screw-clamp terminal blocks for heavy-duty and reliable connections
- DIN-rail mounting case for easy mounting
- Supports PCI-1710U/UL, PCI-1710HGU, PCI-1711U/UL, PCI-1716/L (PCLD-8710) and PCI-1712/1712L (PCLD-8712)

Introduction

The PCLD-8710 is designed to match multifunction cards with 68-pin SCSI-II connectors, such as the PCI-1710U/UL, PCI-1710HGU, PCI-1711U/UL, PCI-1716/L cards. This screw-terminal board also includes cold junction sensing circuitry that allows direct measurements from thermocouple transducers. Together with software compensation and linearization, every thermocouple type can be accommodated. The PCLD-8712 Screw-terminal Board provides convenient and reliable signal wiring for the PCI-1712/L of which has a 68-pin SCSI-II connector.

Due to its special PCB layout you can install passive components to construct your own signal-conditioning circuits. The user can easily construct a low-pass filter, attenuator or current shunt converter by adding resistors and capacitors on board's circuit pads.

Applications

Field wiring for analog and digital I/O channels of PC-LabCard™ products.

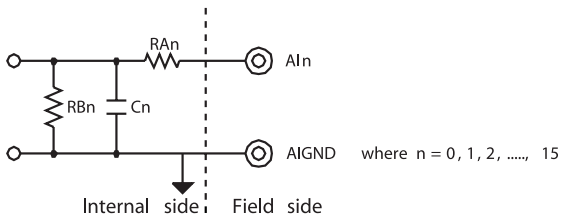
Signal conditioning circuits can be implemented as illustrated in the following examples:

a) Straight-through connection (factory setting)

RAn = 0 Ω (short)

RBn = none

Cn = none



b) 1.6 kHz (3 dB) low pass filter

RAn = 10 KΩ

RBn = none

Cn = 0.01 μF

$$f_{3dB} = \frac{1}{2\pi RAn.Cn}$$

c) 10 : 1 voltage attenuator:

RAn = 9 KΩ

RBn = 1 KΩ

Cn = none

$$\text{Attenuation} = \frac{RBn}{RAn + RBn}$$

(Assume source impedance << 10 KΩ)

d) 4 ~ 20 mA to 1 ~ 5 V_{DC} signal converter:

RAn = 0 Ω (short)

RBn = 250 Ω (0.1% precision resistor)

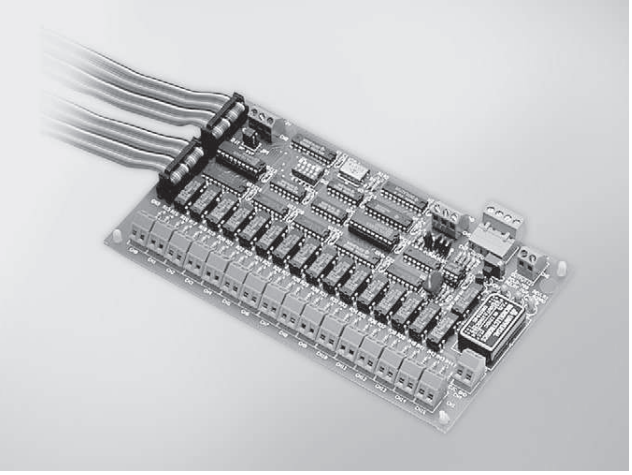
Cn = none

Ordering Information

- **PCLD-8710** DIN-rail Wiring Terminal Board with CJC Circuit
- **PCLD-8712** DIN-rail Wiring Terminal for PCI-1712/L
- **PCL-10120-1E** 20-pin Flat Cable, 1 m
- **PCL-10120-2E** 20-pin Flat Cable, 2 m
- **PCL-10168-1E** 68-pin SCSI Shielded Cable, 1 m
- **PCL-10168-2E** 68-pin SCSI Shielded Cable, 2 m

PCLD-788

16-ch Relay Multiplexer Board



Features

- 16 to 1 channel expansion
- Differential and fully isolated multiplexing
- Break-before-make relay control
- "Channel closed" signal for precise A/D triggering
- Up to 16 PCLD-788s can be cascaded for 256 channels
- Easy wiring for large channel count configuration
- Onboard cold-junction circuitry for thermocouple measurement

Introduction

PCLD-788 multiplexes 16 channels into a single I/O channel of an A/D converter, voltmeter or IEEE-488-based instrument. Up to 16 PCLD-788s can be cascaded for a total of 256 fully-isolated differential channels. The PCLD-788 can be controlled by any PC-LabCard™ product via a 16-bit 20-pin digital output port, found on cards such as the PCL-711B, PCL-812PG or the PCL-818 series. Channel selection (0-15) and board selection (0-15) are done by programming the high-order four bits and low order four bits of a digital output byte from the main I/O card in use.

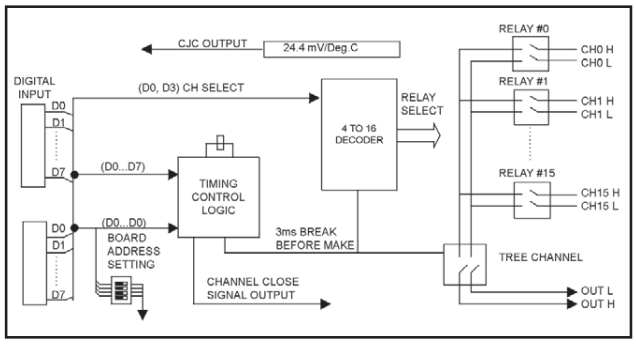
Specifications

I/O

- **Channel Closed Signal** TTL-level pulse
- **Cold-junction Sensor** 24.4 mV/°C, 0 V at 0°C Output
- **Contact Rating** Break-before-make with 3 msec. minimum break time
- **Contact Resistance** 200 mΩ max.
- **Input Channels** 16 isolated differential inputs
- **Programming** DO bit 0, 1, 2 and 3 for channel selection, DO bit 4, 5, 6 and 7 for board selection. Onboard DIP switches for board-address setting
- **Max. Input Voltage** 100 V_{DC} or 100 V peak AC
- **Max. Switching Current** 0.5 A
- **Max. Switching Power** 10 VA
- **Operating Time** 1 ms max.
- **Relay Life Expectancy** 100 million cycles min. at 10 V_{DC} and 1 mA
- **Release Time** 1 msec. max.

General

- **Connectors**
  - Controller: 2 x 20-pin box header, second connector in parallel for daisy chaining
  - I/O: Screw terminals
- **Dimensions (L x W)** 205 x 114 mm (8" x 4.5")
- **Mounting** 4 x screw holes for flat surface mounting
- **Power Consumption** 5 V @ 380 mA max.



PCLD-788 Block Diagram

Pin Assignments

CN2 & CN3

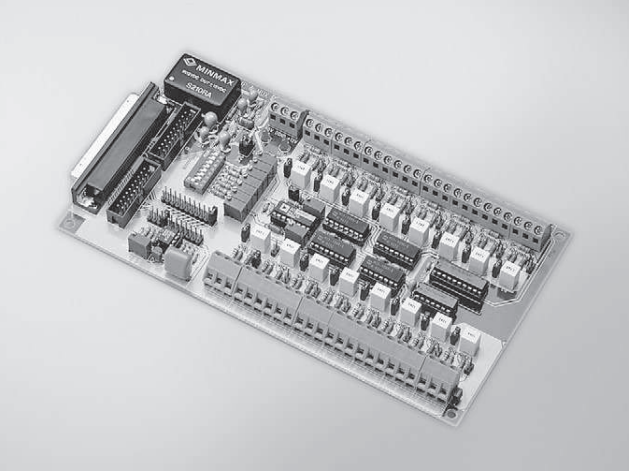
C0	1	2	C1
C2	3	4	C3
C4	5	6	C5
C6	7	8	C7
	9	10	
	11	12	
	13	14	
	15	16	
GND	17	18	GND
+5V	19	20	+12V

Ordering Information

- **PCLD-788** 16-ch Relay MUX Board w/ Two 20-pin Flat Cables
- **PCL-10120-1E** 20-pin Flat Cable, 1 m
- **PCL-10120-2E** 20-pin Flat Cable, 2 m

PCLD-789D

Amplifier and Multiplexer Board



Features

- Multiplexes 16 differential inputs to one A/D input
- Expands a PC-LabCard™ product's analog inputs to 128 channels
- High-grade instrumentation amplifier provides switch selectable gains of 1, 2, 10, 50, 100, 200, 1,000
- Onboard cold-junction compensation circuits for direct thermocouple measurement
- Built-in signal conditioning functions include filter, attenuator and current shunt
- Second connectors onboard allow daisy chaining
- Screw-clamp terminal blocks permit easy and reliable connections

Introduction

PCLD-789D is a front-end signal conditioning and channel multiplexing daughterboard for use with PC-LabCard™ product's analog input ports. It multiplexes 16 differential input channels into a single A/D converter input channel. You can cascade up to ten PCLD-789Ds, allowing a single data acquisition card to access 160 analog input channels.

PCLD-789D has DB37 and 20-pin flat cable connectors and lets your PCL-818L or PCL-818HD access up to 128 channels without using an additional digital output cable to select channels. The PCLD-789D uses a high-grade instrumentation amplifier that provides switch-selectable gains of 1, 2, 10, 50, 100, 200 and 1,000. This amplifier lets you accurately measure low-level signals with your PC-LabCard™ product. The board also contains a cold-junction sensing circuit that allows direct temperature measurement from thermocouple transducers. A wide variety of thermocouples are supported with software compensation and linearization.

Specifications

I/O

- **Cold-junction Compensation** 24.4 mV/°C, 0 V at 0°C
- **Input Channels** 16 differential
- **Input Conditions**

Gains	CMRR	Nonlinearity	Setting Time
1,000	125 dB	0.005% FSR	75 µsec.
100	115 dB	0.005% FSR	15 µsec.
10	105 dB	0.007% FSR	15 µsec.
1	85 dB	0.015% FSR	15 µsec.

- **Input Range** ±10 V max. depending on the selected gain
- **Output Range** ±10 V max.
- **Overvoltage Protection** ±30 V continuous

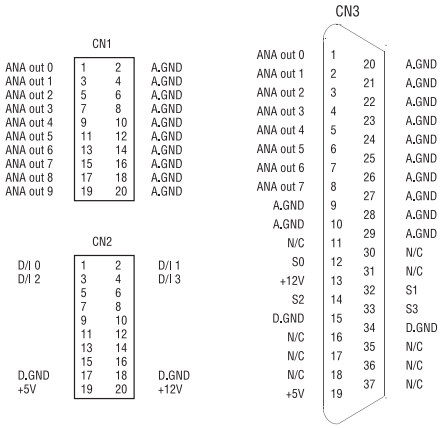
General

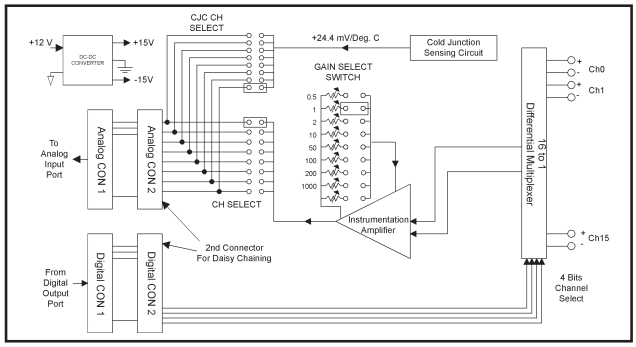
- **Connectors**
  Controller: 1 x DB37 male connector
  2 x 20-pin box header for daisy chaining
  I/O: Screw terminals
- **Dimensions (L x W)** 205 x 114 mm (8.1" x 4.5")
- **Mounting** 4 x screw holes for flat surface mounting
- **Power Consumption** 5 V @ 30 mA max, 12 V @ 80 mA max.

Ordering Information

- **PCLD-789D** Amplifier and Multiplexer Board w/ 1m DB37 Cable
- **PCL-10137-1E** DB37 Cable, 1 m
- **PCL-10137-2E** DB37 Cable, 2 m
- **PCL-10137-3E** DB37 Cable, 3 m
- **PCL-10120-1E** 20-pin Flat Cable, 1 m
- **PCL-10120-2E** 20-pin Flat Cable, 2 m

Pin Assignments





Block Diagram

21

Industrial USB I/O Modules

USB Data Acquisition (DAQ) Series Overview		*21-2*
USB I/O Module Selection Guide		*21-4*
USB Hubs		
USB-4620 **USB-4622**	5-port Full-speed Isolated USB 2.0 Hub 5-port High-speed USB 2.0 Hub	*21-6*
USB DAQ Modules		
USB-4702 **USB-4704**	10 kS/s, 12-bit, 8-ch Multifunction DAQ USB Module 48 kS/s, 14-bit, 8-ch Multifunction DAQ USB Module	*21-7*
USB-4711A	150 kS/s, 12-bit, 16-ch Multifunction DAQ USB Module	*21-8*
USB-4716	200 kS/s, 16-bit, 16-ch Multifunction DAQ USB Module	*21-9*
USB-4718	8-ch Thermocouple Input USB Module with 8-ch Isolated Digital Input	*21-10*
USB-4750	32-ch Isolated Digital I/O USB Module	*21-11*
USB-4751 **USB-4751L**	48-ch Digital I/O USB Module 24-ch Digital I/O USB Module	*21-12*
USB-4761	8-ch Relay and 8-ch Isolated Digital Input USB Module	*21-13*
USB GPIB Modules		
USB-4671	GPIB USB Module	*21-14*

To view all of Advantech's Industrial USB I/O Modules, please visit www.advantech.com/products.

USB Data Acquisition (DAQ) Series Overview

Features

- USB 2.0 Hub and data acquisition & control modules
- Full family extend compatible with PCI-bus data acquisition & control cards
- Versatile mounting methods – wall, panel, DIN-rail, and VESA
- Palm sized and bus-powered
- Detachable screw terminal on modules
- Ready-to-Use software and drivers

Introduction

USB data acquisition products are becoming very popular in the field. Many customers in Asia have utilized our plug-in data acquisition, motion control and communication cards to develop machines, and then distribute them to China, Thailand, Vietnam … and beyond. So far the machine builders needed to bring many tools and spare parts to the end-customer for after service work.

Now we offer a better solution, engineers can just use a notebook and a USB data acquisition module to do the job. Because all the specifications are the same, engineers can directly evaluate the program and troubleshoot on their notebooks.

Besides, the embedded controller is well proved by several industrial applications, and now can provide faster fanless low-power CPU with USB 2.0 interface. The idea is coming to separate computing platform and data acquisition interface into two parts.

The technology of computing platform is always changing. People can enjoy high-stability and high-performance computing platform by leverage those latest embedded technology, also to save the maintenance cost and system upgrade effort.

On the other hand, the data acquisition and control interface technology is not changing frequently. Most of the time those interfaces come together with cable and terminal board, engineers intend to keep the same configuration to provide the stable and reliable data acquisition and control system. That means its life cycle is longer than computing platform, and engineers can reduce the effort by maintain two parts separately.

The transmission rate of USB 2.0 is 480 Mb/s, which can provide the same performance as general purpose PCI-bus data acquisition and control cards. With Advantech's innovative designed on the screw-type USB connection cable, the Advantech USB-based data acquisition and control modules are the next generation solution for industrial test and measurement applications.

Portable, Easy to Install & Use

The Key Benefits of USB DAQ Modules Are:

- **Plug & Play**
  Advantech USB data acquisition series features the plug & play function that users can install/setup the devices and ready to go within seconds.
- **Single Cable Connection with PC**
  The USB series connects to the user's host system via a shielded USB cable and are powered through this cable, which saves users from the annoying wiring and extra accessory costs.
- **Best Companion for Notebook**
  The bus-powered design and compact size make Advantech USB data acquisition series the best mate for the notebook.
- **480 Mb/s Transmission Rates**
  High speed data transmission realizes the high-performance and high-accuracy on the USB data acquisition.

Design Concepts

- **Efficient**
  Advantech USB data acquisition series needs no external power source and can get rid of the power cord and adapters, give users the most convenience on the field side applications.
- **Portable**
  The palm-sized and light-weight USB data acquisition series is suitable for hand carry when you travel to exhibitions or business shows.
- **Speedy**
  480Mbps data transmission rate is 20,000 times faster than traditional RS-485 based I/O, making the USB series possible to achieve heavy-loaded tasks.
- **Integrated**
  All the analog input, analog output, digital input, and digital output functions are integrated into the USB series. Users can get multiple functions by getting only module on hand.
- **Convenient**
  The built-in wiring terminals facilitate the operations without using any wiring cables or terminal boards.

Efficient **Portable** **Speedy** **Integrated** **Convenient**

Extending Benefits to PCI Card Users

Our concept is to keep the same specification as our existed PCI data acquisition cards.

- The same specifications and drivers as PCI cards
- For R&D, easy to develop and diagnose the system
  -The same H/W and S/W between development and run-time
  -Save time and effort on simulation and troubleshooting

USB Module	PCI Card	Functions
USB-4716	PCI-1716	200 kS/s, 16-bit Multifunction
USB-4750	PCI-1750	32-ch Isolated Digital I/O
USB-4751	PCI-1751	48-ch Digital I/O
USB-4761	PCI-1761	8-ch Relay and 8-ch Isolated Digital Input
USB-4671	PCI-1671UP	GPIB Device

*Note: For more detailed specifications, please refer to the respective product pages.

Mounting Scheme of USB DAQ Modules

Advantech provides versatile mounting methods to fit the demand in the field.

- **DIN-rail Mount**
  Advantech's USB DAQ modules come with a bracket that facilitates the DIN-rail mounting onto some streamlined system with Industry standards.
- **Wall/Panel Mount**
  The wallmount kit can help users hang their modules on the wall or other flat surfaces.
- **VESA Mount**
  The VESA bracket can mount the USB data acquisition module to the VESA-ready appliances, such as Advantech's touch panel computers (TPC series) and the flat panel monitors (FPM series).

DIN-rail Mount

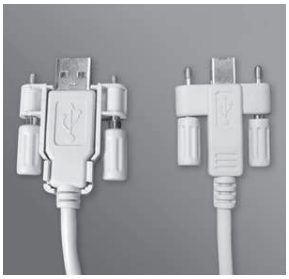
Wall/Panel Mount

VESA Mount

Lockable USB Connector*

The standard USB cable is designed for easy plug and remove, but it's not suitable in industrial application. However the USB 2.0 is one of the high-speed and high-reliable extension interface, Advantech invests R&D effort to provide screw-type USB connection cable. With this innovative cable, the USB-based data acquisition module can be connected firmly.

* Note: USB-4702 and USB-4704 do not support this feature.



Robust & Anti-vibration (P/N: USB-LOCKCABLE-AE)

Advantech also provides another innovated accessory for making the other end of USB cable can be connected to UNO and TPC's USB port firmly. We provide the complete embedded data acquisition and control solution.

Lockable Casing for Type A USB Connector

Software Support for the USB DAQ Series

Advantech provides several software solutions for USB-based data acquisition and control modules.

- **DAQNavi Driver**
  DAQNavi is Advantech latest next-generation driver package which delivers higher performance, compatibility and reliability by brand new driver and SDK architecture. Programmers can find all necessary software components including easy-to-use utility, component-based libraries, example codes, and documentation (include manual and tutorial video) to efficiently complete their development. DAQNavi supports many popular operating systems (OS) such as Windows 8, Windows 7, Windows XP, Windows Server, Linux and Windows CE. It also supports many different programming languages and environments, such as C/C++, VB, Delphi, BCB, LabVIEW, C#, VB .NET, Java and Qt.
- **Advantech Data Logger**
  Advantech Data Logger is a ready-to-use application program that engineers can use it to acquire data from Advantech data acquisition devices like USB modules without programming. User can manage several acquisition tasks with an intuitive configuration wizard for related parameters setting. Acquired data can be displayed with zoom observation in real-time monitoring as well as saved to local disk. The stored data can be recalled and display after acquisition has been completed.
- **LabVIEW Support**
  Advantech supports graphical programming language LabVIEW with specific drivers in the form of Express VI and Polymorphic VIs. DAQNavi Express VI can help to build a LabVIEW data acquisition application in short time, by an interactive DAQNavi wizard to perform corresponding configuration. DAQNavi Polymorphic VIs deliver more flexibility and advance functionality for advance LabVIEW data acquisition programming.

USB I/O Module Selection Guide

Category			Multifunction				Analog Input
Bus			USB				
Model			USB-4702	USB-4704	USB-4711A	USB-4716	USB-4718
Analog Input	General Spec.	Resolution	12 bits	14 bits	12 bits	16 bits	16 bits
		Channels	8 S.E./4 Diff.	8 S.E./4 Diff.	16 S.E./8 Diff.	16 S.E./8 Diff.	8 Diff.
		Onboard FIFO	512 samples	512 samples	1,024 samples	1,024 samples	-
		Sampling Rate	10 kS/s	48 kS/s	150 kS/s	200 kS/s	10 S/s (shared)
	Input Ranges	Unipolar Inputs (V)	-	-	-	0 ~ 10, 0 ~ 5, 0 ~ 2.5, 0 ~ 1.25	J,K,T,E,R,S,B types
		Bipolar Inputs (V)	S.E.: ± 10 Diff.: ±1, ±1.25, ± 2, ± 2.5, ±4, ±5, ±10, ±20	S.E.: ± 10 Diff.: ±1, ±1.25, ± 2, ± 2.5, ±4, ±5, ±10, ±20	±10, ±5, ±2.5, ±1.25, ±0.625	±10, ±5, ±2.5, ±1.25, ±0.625	-
		Configurable Per-Channel	✓	✓	✓	✓	✓
	Trigger Modes	Pacer/Software/ External Pulse	✓	✓	✓	✓	Software
	Data Transfer Modes	Software	✓	✓	✓	✓	✓
		DMA	-	-	-	-	-
Analog Output	Resolution		12 bits	12 bits	12 bits	16 bits	-
	Channels		2	2	2	2	-
	Output Range (V)		0~5	0~5	0 ~ 5, 0 ~ 10, ±5, ±10	0 ~ 5, 0 ~ 10, ±5, ±10	-
	Output Rate		Static update	Static update	Static update	Static update	-
Digital I/O	Input Channels		8	8	8	8	8 (Isolated)
	Output Channels		8	8	8	8	8 (Isolated)
Timer/ Counter	Channels		1	1	1	1	-
	Resolution		32 bits	32 bits	32 bits	32 bits	-
	Max. Input Frequency		5 MHz	5 MHz	1 kHz	1 kHz	-
Isolation Voltage			-	-	-	-	2,500 V_{DC}
BoardID Switch			Software	Software	Software	Software	Software
Dimensions (mm)			70 x 70	132 x 80 x 32	132 x 80 x 32	132 x 80 x 32	132 x 80 x 32
Connector			1 x DB37	Onboard screw terminal	Onboard screw terminal	Onboard screw terminal	Onboard screw terminal
Legacy Driver	Windows XP/2000		✓	✓	✓	✓	✓
	WinCE		-	-	✓	✓	✓
	Linux		-	-	✓	✓	✓
DAQNavi Driver	Windows 8/7/Vista/XP/2000		✓	✓	✓	✓	✓
	WinCE		-	-	-	-	-
	Linux		✓	✓	-	-	✓
LabVIEW Driver			✓	✓	✓	✓	✓
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Catagory			Non-Isolated Digital I/O		Isolated Digital I/O	
Bus			USB			
Model			USB-4751	USB-4751L	USB-4750	USB-4761
TTL DI/O	Input	Channels	48	24	-	-
	Output	Channels			-	-
		Sink Current	12 mA	12 mA	-	-
		Source Current	12 mA	12 mA	-	-
Isolated DI/O	Input	Channels	-	-	16	8
		Isolation Voltage	-	-	2,500 V_{DC}	2,500 V_{DC}
		Input Range	-	-	5 ~ 60 V_{DC}	5 ~ 30 V_{DC}
	Output	Channels	-	-	16	8 x Form C
		Isolation Voltage	-	-	2,500 V_{DC}	2,500 V_{DC}
		Output Range	-	-	5 ~ 40 V_{DC}	-
		Max. Sink Current	-	-	100 mA max. per channel	0.25 A @ 250 V_{AC}, 2 A @ 30 V_{DC}
Timer/Counter	Channels		2	2	2	-
	Resolution		32 bits	32 bits	32 bits	-
	Max. Input Frequency		8 MHz	8 MHz	8 MHz	-
Advanced Function	Output Status Read Back		✓	✓	✓	✓
Isolation Voltage			-	-	2,500 V_{DC}	2,500 V_{DC}
BoardID Switch			Software			
Dimensions (mm)			132 x 80 x 32	132 x 80 x 32	132 x 80 x 32	132 x 80 x 32
Connector			2 x opto-22 compatiable box header	1 x opto-22 compatiable box header	Onboard screw terminal	Onboard screw terminal
Legacy Driver	Windows XP/2000		✓	✓	✓	✓
	WinCE		✓	✓	✓	✓
	Linux		✓	✓	✓	✓
DAQNavi Driver	Windows 8/7/Vista/XP/2000		✓	✓	✓	✓
	WinCE		-	-	-	-
	Linux		✓	-	-	✓
LabVIEW Driver			✓	✓	✓	✓
Page			21-12	21-12	21-11	21-13

USB-4620
USB-4622

5-port Full-speed Isolated USB 2.0 Hub

5-port High-speed USB 2.0 Hub

USB-4620

USB-4622

Features

- 5 downstream USB 2.0 ports
- Compatible with USB 2.0 Full-speed
- 3,000 V_{DC} voltage isolation for each downstream port
- Suitable for DIN-rail mounting
- One lockable USB cable included
- 10 ~ 30 V_{DC} power input (power adapter not included*)

Specifications

Connectivity

- **Ports** Upstream x 1 (Type B) Downstream x 5 (Type A)
- **Compatibility** USB 2.0 Full-speed
- **Transfer Speed** 12 Mbps
- **Supply Current** 500 mA max. per channel

General

- **Housing** Plastic (ABS+PC)
- **Dimensions (L x W x H)** 132 x 80 x 32 mm (5.2" x 3.15" x 1.26")
- **DC Input** 10 ~ 30 V_{DC}
- **Power Consumption** 24 V @ 36 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH non-condensing

Protection

- **Isolation Protection** 3,000 V_{DC}

Ordering Information

- **USB-4620-AE** 5-port Full-speed Isolated USB 2.0 Hub

Accessories

- **PWR-242-AE** DIN-rail Power Supply
- **1960004544** Wallmount Bracket
- **1960005788** VESA Mount Bracket
- **USB-LOCKCABLE-AE** 1.8 M Lockable USB 2.0 Cable with Screw Kit

Features

- 5 downstream USB 2.0 ports
- Compatible with USB 2.0 High-speed, USB 2.0 Full-speed, USB 1.0
- 480 Mbps high-speed data transfer
- LED indicator
- Suitable for DIN-rail mounting
- One lockable USB cable included
- 10 ~ 30 V_{DC} power input (power adapter not included*)

Specifications

Connectivity

- **Ports** Upstream x 1 (Type B) Downstream x 5 (Type A)
- **Compatibility** USB 2.0 High-speed, USB 2.0 Full-speed, USB 1.0
- **Transfer Speed** 480 Mbps/12 Mbps/1.5 Mbps
- **Supply Current** 500 mA max. per channel

General

- **Housing** Plastic (ABS+PC)
- **Dimensions (L x W x H)** 132 x 80 x 32 mm (5.2" x 3.15" x 1.26")
- **DC Input** 10 ~ 30 V_{DC}
- **Power Consumption** 24 V @ 36 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH non-condensing

Ordering Information

- **USB-4622-BE** 5-port High-speed USB 2.0 Hub

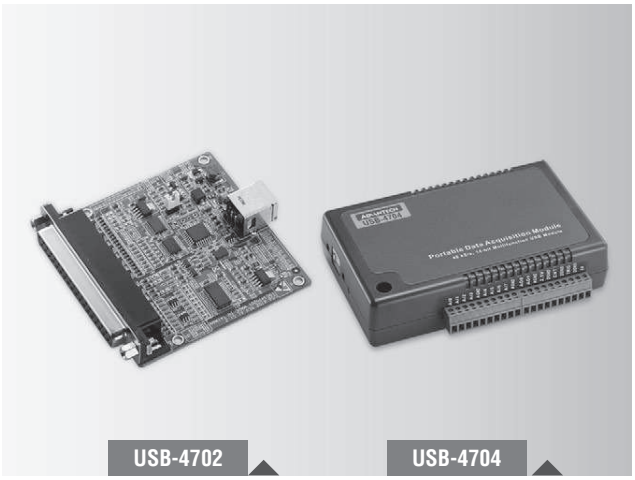
Accessories

- **PWR-242-AE** DIN-rail Power Supply
- **1960004544** Wallmount Bracket
- **1960005788** VESA Mount Bracket
- **USB-LOCKCABLE-AE** 1.8 M Lockable USB 2.0 Cable with Screw Kit

USB-4702
USB-4704

10 kS/s, 12-bit, 8-ch Multifunction DAQ USB Module

48 kS/s, 14-bit, 8-ch Multifunction DAQ USB Module



Features

- Supports USB 2.0
- Portable
- Bus-powered
- 8 analog input channels
- 12-bit (USB-4702), 14-bit (USB-4704) resolution AI
- Sampling rates up to 10 kS/s (USB-4702), 48 kS/s (USB-4704)
- 8-ch DI/8-ch DO, 2-ch AO and one 32-bit counter

Introduction

USB-4702/4704 are low-cost USB data acquisition modules. You no longer need to open the chassis to install DAQ modules. Just plug in the module, then get the data. It's easy and efficient. Reliable and rugged enough for industrial applications, yet inexpensive enough for home projects, USB-4702/4704 are the perfect way to add measurement and control capability to any USB capable computer. It obtains all required power from the USB port, so no external power connection is ever required. With the features of USB-4702/4704, they are your most cost effective choice of lab or production line test & measurement tool.

Specifications

Analog Input

- **Channels** 8 single-ended/4 differential (software programmable)
- **Resolution** USB-4702: Single-ended: 11 bits
  Differential: 12 bits
  SUB-4704: Single-ended: 13 bits
  Differential: 14 bits
- **Max. Sampling Rate** USB-4702: 10 kS/s max.
  USB-4704: 48 kS/s max.

Note: The sampling rate for each channels will be affected by used channel number. For example, if 4 channels of USB-4702 are used, the sampling rate is 10k/4 = 2.5 kS/s per channel.

- **FIFO Size** 512 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 127 kΩ
- **Sampling Modes** Software, onboard programmable pacer, and external
- **Input Range (V, software programmable) & Absolute Accuracy**

Single Ended		±10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Differential		N/A	±1	±1.25	±2	±2.5	±4	±5	±10	±20
Absolute Accuracy (% of FSR)*	USB-4702	0.2	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
	USB-4704	0.15	0.1	0.1	0.1	0.1	0.1	0.1	0.15	0.15

*: ±1 LSB is added as the derivative for absolute accuracy

Analog Output

- **Channels** 2
- **Resolution** 12 bits
- **Output Rate** Static update
- **Output Range** (V, software programmable) 0~5
- **Slew Rate** 0.7 V/μs
- **Driving Capability** 5 mA
- **Output Impedance** 51 Ω
- **Operation Mode** Single output
- **Accuracy** Relative: ±12 LSB
  Differential non-linearity: ±5 LSB

Digital Input

- **Channels** 8
- **Compatibility** 3.3 V/5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.

Digital Output

- **Channels** 8
- **Compatibility** 3.3 V/TTL
- **Output Voltage** Logic 0: 0.4 V max.@ 4 mA (sink)
  Logic 1: 3.5 V min.@ 4 mA (source)

Counter

- **Channels** 1
- **Resolution** 32 bits
- **Compatibility** 3.3 V/TTL
- **Max. Input Frequency** 5 MHz

General

- **Bus Type** USB 2.0
- **I/O Connector** USB-4702: 1 x DB37 female connector
  USB-4704: Onboard screw terminal
- **Dimensions (L x W)** USB-4702: 70 x 70 mm (2.76" x 2.76")
  USB-4704: 132 x 80 x 32 mm (5.2" x 3.15" x 1.26")
- **Power Consumption** Typical: 5 V @ 100 mA
  Max.: 5 V @ 500 mA
- **Operating Temperature** 0 ~ 55°C (32 ~ 131°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH non-condensing

Ordering Information

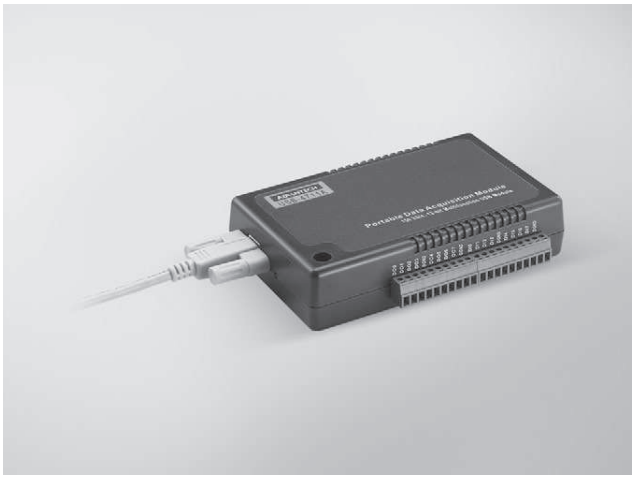
- **USB-4702-AE** 10 kS/s, 12-bit, 8-ch Multi. USB Module
- **USB-4704-AE** 48 kS/s, 14-bit, 8-ch Multi. USB Module

Accessories

- **PCL-10137-1E** DB37 Cable, 1m
- **PCL-10137-2E** DB37 Cable, 2m
- **PCL-10137-3E** DB37 Cable, 3m
- **ADAM-3937-BE** DB37 DIN-rail Wiring Board
- **1960004544** Wallmount Bracket
- **1960005788** VESA Mount Bracket

USB-4711A

150 kS/s, 12-bit, 16-ch Multifunction DAQ USB Module



Features

- Supports USB 2.0
- Portable
- Bus-powered
- 16 analog input channels
- 12-bit resolution AI
- Sampling rate up to 150 kS/s
- 8-ch DI/8-ch DO, 2-ch AO and one 32-bit counter
- Detachable screw terminal on modules
- Suitable for DIN-rail mounting
- One lockable USB cable for secure connection included

Introduction

The USB-4700 series consists of true plug & play data acquisition modules. You no longer need to open the chassis to install DAQ modules. Just plug in the module, then get the data. It's easy and efficient. Reliable and rugged enough for industrial applications, yet inexpensive enough for home projects, the USB-4700 series module is the perfect way to add measurement and control capability to any USB capable computer. The USB-4700 series is fully plug & play and with onboard terminal block for easy usage. It obtains all required power from the USB port, so no external power connection is ever required. USB-4711A is a multifunction module, with 16-ch Analog Input, 2-ch Analog Output, 16-ch Digital I/O and counter channel which is able to output a constant frequency square wave. With the features of USB-4700 series; USB-4711A is your most cost effective choice of lab or production line test & measurement tool.

Specifications

Analog Input

- **Channels** 16 single-ended/8 differential (software programmable)
- **Resolution** 12 bits
- **Max. Sampling Rate** 150 kS/s max.

Note: The sampling rate for each channels will be affected by used channel number. For example, if 4 channels are used, the sampling rate is 150k/4 = 37.5 kS/s per channel.

- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 1 GΩ
- **Sampling Modes** Software, onboard programmable pacer, and external
- **Input Range (V, software programmable) & Absolute Accuracy**

Bipolar	± 10	± 5	± 2.5	± 1.25	± 0.625
Absolute Accuracy (% of FSR)*	0.1	0.1	0.2	0.2	0.4

*: ±1 LSB is added as the derivative for absolute accuracy

Analog Output

- **Channels** 2
- **Resolution** 12 bits
- **Output Rate** Static update
- **Output Range** (V, software programmable)

Internal Reference	Unipolar	0 ~ 5, 0 ~ 10
	Bipolar	±5, ±10

- **Slew Rate** 0.125 (manual)
- **Driving Capability** 5 mA (manual)
- **Output Impedance** 0.1 Ω (manual)
- **Operation Mode** Single output
- **Accuracy** Relative: ±1 LSB
  Differential non-linearity: ±1 LSB

Digital Input

- **Channels** 8
- **Compatibility** 3.3 V/5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2.0 V min.

Digital Output

- **Channels** 8
- **Compatibility** 3.3 V/TTL
- **Output Voltage** Logic 0: 0.8 V max.@ 6 mA (manual)
  Logic 1: 2.0 V min.@ 6 mA (manual)

Event Counter

- **Channels** 1
- **Compatibility** 3.3 V/TTL
- **Max. Input Frequency** 1 kHz

General

- **Bus Type** USB 2.0
- **I/O Connector** Onboard screw terminal
- **Dimensions (L x W x H)** 132 x 80 x 32 mm (5.2" x 3.15" x 1.26")
- **Power Consumption** Typical: 5 V @ 360 mA (manual)
  Max.: 5 V @ 450 mA (manual)
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH non-condensing

Ordering Information

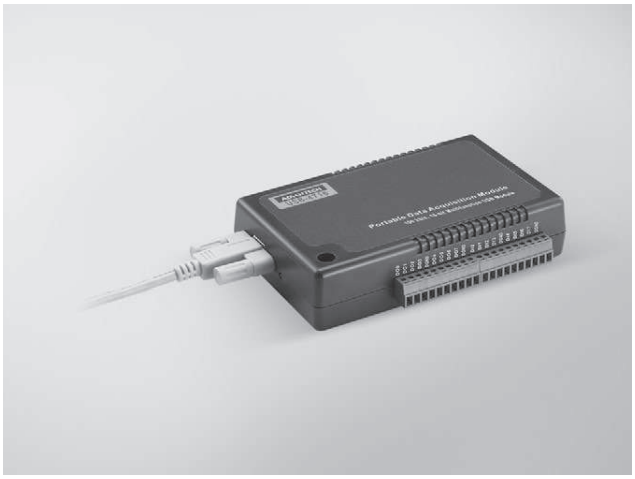
- **USB-4711A-AE** 150 kS/s, 12-bit, 16-ch Multi. USB Module

Accessories

- **1960004544** Wallmount Bracket
- **1960005788** VESA Mount Bracket

USB-4716

200 kS/s, 16-bit, 16-ch Multifunction DAQ USB Module



CE FCC RoHS

Features

- Supports USB 2.0
- Portable
- Bus-powered
- 16 analog input channels
- 16-bit resolution AI
- Sampling rate up to 200 kS/s
- 8-ch DI/8-ch DO, 2-ch AO and one 32-bit counter
- Detachable screw terminal on modules
- Suitable for DIN-rail mounting
- One lockable USB cable for secure connection included

Introduction

The USB-4700 series consists of true plug & play data acquisition devices. No more opening up your computer chassis to install boards just plug in the module, then get the data. It's easy and efficient. USB-4716 offers 16 single-ended/ 8 differential inputs with 16-bit resolution, up to 200 kS/s throughput, 16 digital I/O lines and 1 user counter, plus two 16-bit analog outputs. The high performance makes USB-4716 your best choice for test & measurement applications in the production line or in the lab.

Reliable and rugged enough for industrial applications, yet inexpensive enough for home projects, the USB-4716 is the perfect way to add measurement and control capability to any USB capable computer. The USB-4700 series is fully plug & play and easy to use. It obtains all required power from the USB port, so no external power connection is ever required.

Specifications

Analog Input

- **Channels** 16 single-ended/ 8 differential (software programmable)
- **Resolution** 16 bits
- **Max. Sampling Rate** 200 kS/s (for USB 2.0)

Note: The sampling rate for each channels will be affected by used channel number. For example, if 4 channels are used, the sampling rate is 200k/4 = 50 kS/s per channel.

- **FIFO Size** 1,024 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** 1 GΩ
- **Sampling Modes** Software, onboard programmable pacer, or external
- **Input Range (V, software programmable) & Absolute Accuracy**

Single Ended	N/A	0 ~ 10	0 ~ 5	0 ~ 2.5	0 ~ 1.25
Differential	±10	±5	±2.5	±1.25	±0.625
Absolute Accuracy (% of FSR)*	0.05	0.03	0.03	0.05	0.1

*: ±1 LSB is added as the derivative for absolute accuracy

Analog Output

- **Channels** 2
- **Resolution** 16 bits
- **Output Rate** Static update
- **Output Range** (V, software programmable)

Internal Reference	**Unipolar**	0 ~ 5 , 0 ~ 10
	Bipolar	±5, ±10

- **Slew Rate** 0.125 V/μs (manual)
- **Driving Capability** 5 mA
- **Output Impedance** 0.1 Ω max.
- **Operation Mode** Single output
- **Accuracy** Relative: ±1 LSB

Digital Input

- **Channels** 8
- **Compatibility** 3.3 V/5 V/TTL
- **Input Voltage** Logic 0: 1.0 V max. Logic 1: 2.0 V min.

Digital Output

- **Channels** 8
- **Compatibility** 3.3 V/TTL
- **Output Voltage** Logic 0: 0.4 V max. Logic 1: 2.4 V min.
- **Output Capability** Sink: 6 mA (sink) Source: 6 mA (source)

Event Counter

- **Channels** 1
- **Compatibility** 3.3V/TTL
- **Max. Input Frequency** 1 kHz

General

- **Bus Type** USB 2.0
- **I/O Connector** Onboard screw terminal
- **Dimensions (L x W x H)** 132 x 80 x 32 mm (5.2" x 3.15" x 1.26")
- **Power Consumption** Typical: 5 V @ 360 mA Max.: 5 V @ 450 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 158°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Operating Humidity** 5 ~ 85% RH non-condensing
- **Storage Humidity** 5 ~ 95% RH non-condensing

Ordering Information

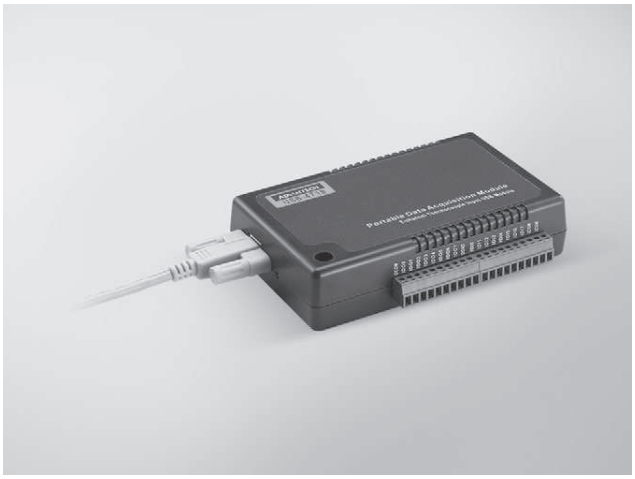
- **USB-4716-AE** 200 kS/s, 16-bit, 16-ch Multi. USB Module

Accessories

- **1960004544** Wallmount Bracket
- **1960005788** VESA Mount Bracket

USB-4718

8-ch Thermocouple Input USB Module with 8-ch Isolated Digital Input



Features

- Supports USB 2.0
- Supports voltage, current, and thermocouple inputs
- Bus-powered
- 8 thermocouple input channels
- 2,500 V_{DC} isolation
- Supports 4 ~ 20 mA current input
- Detachable screw terminal on modules
- 8-ch isolated DI and 8-ch isolated DO
- Suitable for DIN-rail mounting
- One lockable USB cable for secure connection included

Introduction

The USB-4700 series consists of true plug & play data acquisition devices. No more opening up your computer chassis to install boards just plug in the module, then get the data. It's easy and efficient. USB-4718 offers 8 thermocouple inputs with 16-bit resolution, up to 0.1% input range accuracy. Portable design makes the USB-4718 suitable for field research. Also, the input channels can be set separately making handling multiple type of sensors with just one USB-4718 module possible.

Reliable and rugged enough for industrial applications, yet inexpensive enough for home projects, the USB-4718 is the perfect way to add measurement and control capability to any USB capable computer. The USB-4700 series is fully plug and play and easy to use. It obtains all required power from the USB port, so no external power connection is ever required.

Specifications

Analog Input

- **Accuracy** ±0.1% for voltage input
- **Bandwidth** 13.1 Hz @ 50 Hz, 15.72 Hz @ 60 Hz
- **Channels** 8 differential
- **Ch. Independent Conf.** Yes
- **CMR @ 50/60 Hz** 92 dB min.
- **Resolution** 16 bits
- **Input Impedance** 1.8 MΩ
- **Input Range** 0 ~ 15 mV, 0 ~ 50 mV, 0 ~ 100 mV, 0 ~ 500 mV, 0 ~ 1 V, 0 ~ 2.5 V, 0 ~ 20 mA, 4 ~ 20 mA
- **Input Types** Thermocouple, mV, V, mA
- **Sampling Rate** 10 S/s (shared for all channels)

Note: The sampling rate for each channel is fixed due to the hardware design. It is 10/8 = 1.25 S/s per channel no matter how many channels you use.

- **Span Drift** ±25 ppm/°C
- **T/C Type and Temperature Ranges**

J	0 ~ 760°C	**R**	500 ~ 1750°C
K	0 ~ 1370°C	**S**	500 ~ 1750°C
T	-100 ~ 400°C	**B**	500 ~ 1800°C
E	0 ~ 1000°C		

- **TVS/ESD Protection** Built-in
- **Zero Drift** ±0.3 μV/°C

Isolated Digital Input

- **Channels** 8
- **Input Voltage** Logic 0: 3 V max. (manual) Logic 1: 5 V min. (30 V max.)
- **Isolation Protection** 2,500 V_{DC}
- **Opto-isolator Response** 25 μs

Isolated Digital Output

- **Channels** 8
- **Output Type** Sink (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 30 V_{DC}, 1.1 A max./ total
- **Sink Current** 200 mA max./channel
- **Opto-isolator Response** 25 μs

General

- **Bus Type** USB 2.0
- **I/O Connector** Onboard screw terminal
- **Dimensions (Lx W x H)** 132 x 80 x 32 mm (5.2" x 3.15" x 1.26")
- **Power Consumption** 100 mA @ 5 V
- **Watchdog Timer** 1.6 sec. (system)
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH non-condensing

Ordering Information

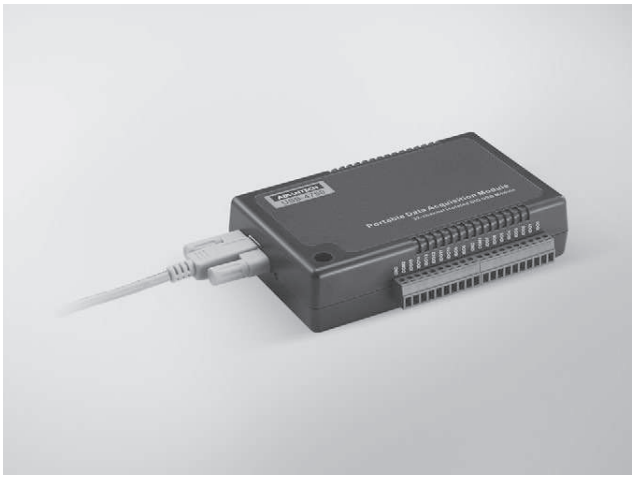
- **USB-4718-AE** 8-ch Thermocouple Input USB Module

Accessories

- **1960004544** Wallmount Bracket
- **1960005788** VESA Mount Bracket

USB-4750

32-ch Isolated Digital I/O USB Module



Features

- Compatible with USB 1.1/2.0
- Bus-powered
- 16 isolated DI and 16 isolated DO channels
- High voltage isolation on all channels (2,500 V_{DC})
- High sink current on isolated output channels (100 mA/Channels)
- Supports 5 ~ 60 V_{DC} isolated input channels
- Interrupt handling capability
- Timer/counter capability
- Suitable for DIN-rail mounting
- One lockable USB cable for secure connection included

Introduction

The USB-4700 series consists of true plug & play data acquisition devices. No more opening up your computer chassis to install boards-just plug in the module, then get the data.

It's easy and efficient. USB-4750 is a 32-channel isolated digital I/O module. With isolation protection of 2,500 V_{DC}, and dry contact support, USB-4750 is ideal for industrial applications where high-voltage protection is required. Each I/O channel of the USB-4750 corresponds to a bit in an I/O port. This makes USB-4750 very easy to program. This module also offers a counter or timer and one digital input interrupt lines to a PC. So users can then easily do configurations by software.

Reliable and rugged enough for industrial applications, yet inexpensive enough for home projects, the USB-4750 is the perfect way to add measurement and control capability to any USB capable computer. The USB-4750 is fully USB plug & play and easy to use. It obtains all required power from the USB port, so no external power connection is ever required.

Specifications

Isolated Digital Input

- **Channels** 16
- **Input Voltage** Logic 0: 5 V max. (manual)
  Logic 1: 5 V min. (60 V max.) or dry contact
- **Interrupt Capable Ch.** 2
- **Isolation Protection** 2,500 V_{DC}

Isolated Digital Output

- **Channels** 16
- **Output Type** Sink (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 100 mA max. per channel
  Total 1.1 A max.

Isolated Counter

- **Channels** 2
- **Resolution** 32-bit
- **Max. Input Frequency** 8 MHz (manual)
- **Isolation Protection** 2,500 V_{DC}

General

- **Bus Type** USB 1.1/2.0
- **I/O Connector** Onboard screw terminal
- **Dimensions (L x W x H)** 132 x 80 x 32 mm (5.2" x 3.15" x 1.26")
- **Power Consumption** Typical: 5 V @ 200 mA
  Max.: 5 V @ 350 mA (manual)
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

- **USB-4750-AE** 32-ch Isolated Digital I/O USB Module

Accessories

- **1960004544** Wallmount Bracket
- **1960005788** VESA Mount Bracket

USB-4751
USB-4751L

48-ch Digital I/O USB Module

24-ch Digital I/O USB Module

Features

- Compatible with USB 1.1/2.0
- Portable
- Bus-powered
- 48/24 TTL digital I/O lines
- Emulates mode 0 of 8255 PPI
- Buffered circuits for higher driving capacity than the 8255
- Interrupt handling capability
- Timer/Counter interrupt capability
- Supports both dry and wet contact
- 50-pin Opto-22 compatible box header
- Suitable for DIN-rail mounting
- One lockable USB cable for secure connection included

Introduction

The USB-4700 series consists of true plug & play data acquisition devices. No more opening up your computer chassis to install boards just plug in the module, then get the data. It's easy and efficient. USB-4751/4751L is a 48/24-bit digital I/O module with USB interface. Its 48/24 bits are divided into six/three 8-bit I/O ports and users can configure each port as input or output via software. USB-4751/USB-4751L also provides one event counter and three 16-bit timers, which can be cascaded to become a 32-bit timer.

Specifications

Digital Input

- **Channels** USB-4751: 48 (shared with output)
  USB-4751L: 24 (shared with output)
- **Compatibility** 5 V/TTL
- **Input Voltage** Logic 0: 0.8 V max.
  Logic 1: 2 V min.

Digital Output

- **Channels** USB-4751: 48 (shared with input)
  USB-4751L: 24 (shared with input)
- **Compatibility** 5 V/TTL
- **Output Voltage** Logic 0: 0.5 V max.
  Logic 1: 3.8 V min.
- **Output Capability** Sink: 12 mA @ 0.5 V
  Source: 12 mA @ 3.8 V for single channels
  5 mA @ 3.8 V for all channels in high status

Counter/Timer

- **Channels** 2
- **Resolution** 32-bit
- **Max. Input Frequency** 8 MHz (manual)

General

- **Bus Type** USB 1.1/2.0
- **I/O Connector** 50-pin box headers, pin assignments are fully compatible with Opto-22 I/O module racks
- **Dimensions (L x W x H)** 132 x 80 x 32 mm (5.2" x 3.15" x 1.26")
- **Power Consumption** Typical: 5 V @ 200 mA
  Max.: 5 V @ 500 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95% RH, non-condensing

Ordering Information

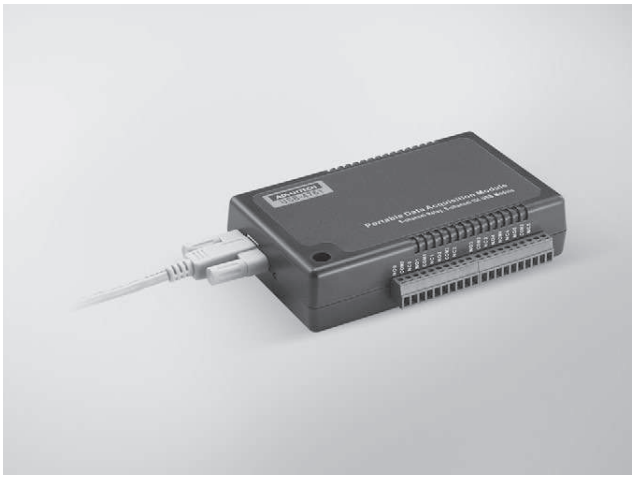
- **USB-4751-AE** 48-ch Digital I/O USB Module
- **USB-4751L-AE** 24-ch Digital I/O USB Module

Accessories

- **1960004544** Wallmount Bracket
- **1960005788** VESA Mount Bracket
- **PCL-10150-1.2E** 50-pin Flat Cable, 1.2 m
- **ADAM-3950-AE** 50-pin DIN-rail Flat Cable Wiring Board
- **PCLD-782B-AE** 24-ch IDI Board w/ 20-pin & 50-pin Flat Cables
- **PCLD-785B-AE** 24-ch Relay Board w/ 20- pin & 50-pin Flat Cables

USB-4761

8-ch Relay and 8-ch Isolated Digital Input USB Module



CE FCC RoHS

Features

- Compatible with USB 1.1/2.0
- Portable
- Bus-powered
- 8 relay output channels and 8 isolated digital input channels
- LED indicators to show activated relays
- 8 Form C type relay output channels
- High-voltage isolation on input channels (2,500 V_{DC})
- High ESD protection (2,000 V_{DC})
- Wide input range (5 ~ 30 V_{DC})
- Interrupt handling capability
- Detachable screw terminal on modules
- Suitable for DIN-rail mounting
- One lockable USB cable for secure connection included

Introduction

The USB-4761 is a relay actuator and isolated digital input module with USB interface. It provides 8 optically-isolated digital inputs with isolation protection of 2,500 V_{DC} for collecting digital signals in noisy environments and 8 relay actuators for serving as on/off control devices or small power switches. For easy monitoring, each relay is equipped with one green LED to show its on/off status.

Rugged Protection

The USB-4761's digital input channels feature a rugged isolation protection for industrial, lab and machinery automation applications. They durably withstand voltages up to 2,500 V_{DC}, protecting your host system from any incidental harms. If connected to an external input source with surge-protection, the USB-4761 can offer up to a maximum of 2,000 V_{DC} ESD (Electrostatic Discharge) protection.

Specifications

Isolated Digital Input

- **Channels** 8
- **Input Voltage** Logic 0: 2 V max.
Logic 1: 5 V min. (30 V max.)
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 25 µs

Relay Output

- **Contact Rating** 0.25 A @ 250 V_{AC}, 2 A @ 30 V_{DC}
- **Max. Switching Power** 62.5 VA, 60 W
- **Max. Switching Voltage** 250 V_{AC}, 220 V_{DC}
- **Max. Switching Current** 5 A
- **Min. Switching Voltage** 100 µV
- **Operate/Release Time** typ. 3 / 2 ms, max. 5 / 4 ms
- **Resistance** Contact: 50 mΩ max. @ 10 mA/20 mV
Insulation: 1 GΩ min. @ 500 V_{DC}
- **Life Expectancy (Electrical)** 5 x 10^7 cycles typ. @ 10 mA/12 V
2 x 10^5 cycles typ. @ 2000 mA/30 V

General

- **Bus Type** USB 1.1/2.0
- **I/O Connector** Onboard screw terminal
- **Dimensions (L x W x H)** 132 x 80 x 32 mm (5.2" x 3.15" x 1.26")
- **Power Consumption** Typical: 5 V @ 60 mA
Max.: 5 V @ 400 mA
- **Operating Temperature** 0 ~ 60°C (32 ~ 140°F)
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Storage Humidity** 5 ~ 95 % RH, non-condensing

Ordering Information

- **USB-4761-AE** 8-ch Relay/Isolated Digital Input USB Module

Accessories

- **1960004544** Wallmount Bracket
- **1960005788** VESA Mount Bracket

USB-4671

GPIB USB Module

CE FCC

Features

- Supports USB 2.0
- Convenient portable design
- Bus-powered
- Complete IEEE 488.1 & 488.2 compatibility
- Full driver, library, and example support, including; Visual C++®, Visual C#®, Visual Basic®, Visual Basic .NET®, Delphi®, and LabView
- Provides powerful and easy-to-use configuration utility
- No GPIB cable required for instrument connection
- Plug & Play installation and configuration

Introduction

USB-4671 is a high-performance USB Module with a GPIB interface. The module is fully compatible with IEEE 488.1 and 488.2 standards with USB 2.0 bus specification. With two driver control modes: controller mode and slave mode; USB-4671 can perform basic IEEE 488 talker, listener and controller functions required by IEEE 488.2. You can also connect up to 15 GPIB instruments. Therefore, USB-4671 is especially suitable for instrument measurements and control.

Furthermore, USB-4671 also offers powerful testing features and a configuration utility that allows users to easily access and control instruments. USB-4671 offers a comprehensive supplementary controller driver database and provides standard IEEE-488 commands to help users develop applications. Users can use an interactive GPIB window interface to control devices directly without any need of programming.

Specifications

GPIB

- **Compatibility** IEEE 488.1 & IEEE 488.2
- **GPIB Transfer Rate** 1.8 MB/s
- **OS Support** Windows 2000/XP/Vista and Win 7
- **Library Support** Visual C++, Visual C#, Visual Basic, Visual Basic .NET, Delphi, LabView
- **Max. GPIB Connections** 15

General

- **Bus Type** USB 2.0
- **I/O Connector** 1 x 24-pin IEEE 488
- **Storage Temperature** -20 ~ 70°C (-4 ~ 158°F)
- **Operating Humidity** 10 ~ 90% RH, non-condensing
- **Dimensions (L x W x H)** 107 x 66 x 26 mm (4.21" x 2.6" x 1.02")

Ordering Information

- **USB-4671-A** GPIB USB Module

Accessories

- **PCL-10488-2** IEEE-488 Cable, 2 m

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